

5
2009

LIBRARY
Michigan State
University

This is to certify that the
thesis entitled

A Comparison of the Organization of Lithic Technology at Two
Prehistoric Pueblos in Central New Mexico

presented by

Jacob Edward Foss

has been accepted towards fulfillment
of the requirements for the

M.A. degree in Anthropology

Alison Ekantun

Major Professor's Signature

5/15/09

Date

MSU is an Affirmative Action/Equal Opportunity Employer

PLACE IN RETURN BOX to remove this checkout from your record.
TO AVOID FINES return on or before date due.
MAY BE RECALLED with earlier due date if requested.

DATE DUE	DATE DUE	DATE DUE

A COMPARISON OF THE ORGANIZATION OF LITHIC TECHNOLOGY AT TWO
PREHISTORIC PUEBLOS IN CENTRAL NEW MEXICO

VOLUME I

By

Jacob Edward Foss

A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements for
the degree of

MASTER OF ARTS

Anthropology

2009

A COM.

T

spatially

clusters

character

Mexico.

that comp

investiga

two cont

Jumanos

environm

and inter

Pueblo d

behavior

minor d

suggest

social. r

cluster.

observa

impact

ABSTRACT

A COMPARISON OF THE ORGANIZATION OF LITHIC TECHNOLOGY AT TWO PREHISTORIC PUEBLOS IN CENTRAL NEW MEXICO

By

Jacob Edward Foss

The concept of “settlement clusters” in Southwestern archaeology signifies spatially distinct groups of pueblos (Mera 1940). The genesis and nature of settlement clusters is an important research question, as it informs on the scale, intensity, and character of regional (and sub-regional) interactions. In the Salinas region of central New Mexico, the protohistoric period Jumanos cluster pueblos included several large pueblos that competed with one another for social, economic, and political status. This thesis investigates the significance of cluster membership for earlier pueblos. Here, I compare two contemporaneous pueblos that lie within the boundaries of the protohistoric period Jumanos cluster. These two Glaze A pueblos are similar in many respects: size, environmental setting, function, site layout, and location. This study compares the intra- and inter-site organization of chipped stone technology at Frank’s Ruin (LA-9032) and Pueblo de la Mesa (LA-2091), to identify whether these similarities include economic behaviors as evidenced by tool curation. This comparison shows that there were some minor differences, although generally the two sites were quite similar. These results suggest that while archaeological research and historical records indicate that there were social, political and/or economic differentiation among pueblos within the Jumanos cluster, these differences are not apparent when we consider earlier pueblos. Perhaps the observed differences emerged later in time; alternatively, these differences may not have impacted people’s decisions regarding the procurement, use, and discard of stone tools.

To the Foss, Burritt, Van Gilder, Howe, and Merk families

O'Gor

especi

and en

possibl

=05219

Forest S

and =A

Bob H

staff for

S

quarter f

Service s

and acco

field sch

teamwor

N

support

work w

untold

Thank y

ACKNOWLEDGMENTS

I would like to thank my committee members, Dr. Bill Lovis and Dr. Jodie O’Gorman, for their time and effort commenting on drafts and sharing ideas. I am especially indebted to Dr. Alison Rautman, my committee chair, who guided this work and encouraged me to study Salinas archaeology. This work would also not have been possible without the funding of Dr. Rautman’s National Science Foundation Grant #0521928, National Geographic Society Grant #4822-92, grants from the United States Forest Service, as well as the permission of the state of New Mexico (permits #SE-238 and #AE-120). The support and kindness of the Department of Anthropology chair, Dr. Bob Hitchcock, is also greatly appreciated. I would also like to thank the department’s staff for always patiently answering questions and ushering me through the process.

Special appreciation is accorded to the Kite family, who graciously provided quarter for the 2007 Frank’s Ruin field school on their property. The National Park Service staff at the Salinas Pueblo Missions National Monument was also good natured and accommodating during the 2007 field season. All of the participants of the 2007 field school made for a memorable and productive experience, their cooperation and teamwork was truly outstanding.

My family has always encouraged me to pursue my interests, providing help, support, and reassurance along the way, for which I am deeply thankful. None of this work would have seen the light of day if not for my wife Nicole, who helped me through untold drafts, frustrations, and second-guessings, all while finishing her own thesis. Thank you Nicole.

LIST C

LIST O

CHAPT

INTRO

CHAPT

ENVIR

CHAPT

OCCUP

RUN...

I

E

P

F

C

CHAPT

SAMPL

TABLE OF CONTENTS

LIST OF TABLES	ix
LIST OF FIGURES	xxii
CHAPTER 1	
INTRODUCTION	1
Organization of Research.....	2
CHAPTER 2	
ENVIRONMENTAL SETTING AND CULTURE HISTORY	10
Environmental Setting	10
Culture History.....	11
Pithouse Period (A.D 950-1250).....	12
Jacal Period (A.D. 1175-1350)	13
Transitional Period (Late A.D. 1200s).....	14
Early Masonry Period (Late A.D. 1200s through Middle A.D. 1300s).....	14
Late Masonry Period (A.D. 1400-1450)	15
Summary and Discussion.....	19
CHAPTER 3	
OCCUPATIONS AND EXCAVATIONS AT PUEBLO DE LA MESA AND FRANK'S RUIN.....	20
Introduction.....	20
Excavation Methodology	20
Pueblo de la Mesa	23
Occupation Phase I	25
Occupation Phase II	26
Frank's Ruin.....	28
Overview of Similarities and Differences: Pueblo de la Mesa and Frank's Ruin	31
CHAPTER 4	
SAMPLING METHODOLOGY AND ANALYTICAL DIMENSIONS.....	34
Introduction.....	34
Sampling of Frank's Ruin and Pueblo de la Mesa.....	34
Lithic Raw Material Types in the Salinas Region	39
Local Limestone.....	40
Local Quartzite.....	41
Local Chert.....	41
Local Chalcedony	42
Near-Local Mountainair Chert.....	42
Non-Local Igneous.....	42
Non-Local Obsidian.....	43
"Other" Raw Material Types	43
Summary	43

CHA
ANA

CHAPT
GENER

CHAPT
FRAN

CHAPTER 5	
ANALYTICAL FRAMEWORK.....	45
Introduction	45
Theoretical Foundation: Organization of Lithic Technology	45
Curated and Expedient Tools.....	46
Examples of the Curated/Expedient Distinction Implemented in Research.....	48
Relevance to this Research	51
Caveats to Organization of Technology Studies.....	52
Analytical and Laboratory Methods	53
Chipped Stone Tools.....	54
Stone Tool Laboratory Analysis	54
Curated and Expedient Tools.....	57
Quantification Problem in Stone Tool Assemblages	63
Stone Tool Assemblage Comparisons and Predictions	64
Chipped Stone Debitage	65
Debitage Analysis and Replicative Experiments.....	66
Flake Size and Mass Analysis.....	69
Mass Analysis Predictions	73
Dorsal Cortex Cover	74
Dorsal Cortex Cover Predictions	76
Unique Assemblage Caveats.....	77
CHAPTER 6	
GENERAL SITE COMPARISONS	80
Introduction.....	80
Analysis Interpretive Methods and Naming Conventions (Chapters 6, 7, 8, and 9)	80
Analysis Statistical Methods (Chapters 6, 7, 8, and 9)	81
Rounding of Completeness Factor Corrected Values (Chapters 6, 7, 8, and 9)	82
Raw Material Divisions (Chapters 6, 7, 8, and 9).....	83
General Comparison: Overall Chipped Stone Artifact Frequency and Density	83
General Comparison: Overall Raw Material Use	87
General Comparison: Morpho-Functional Tool Types	95
General Comparison Discussion.....	102
CHAPTER 7	
FRANK'S RUIN INTRA-SITE ANALYSES.....	103
Introduction.....	103
Frank's Ruin Debitage: Room Cortex Cover	104
Frank's Ruin Debitage: Room Size Class	106
Frank's Ruin Debitage: Room Summary	109
Frank's Ruin Debitage: Plaza Cortex Cover	110
Frank's Ruin Debitage: Plaza Size Class	112

Frank's Ruin Debitage: Plaza Summary	115
Frank's Ruin Debitage: Midden Cortex Cover	115
Frank's Ruin Debitage: Midden Size Class.....	118
Frank's Ruin Debitage: Midden Summary.....	121
Frank's Ruin Debitage: Site Cortex Cover.....	121
Frank's Ruin Debitage: Site Size Class.....	124
Frank's Ruin Debitage: Intra-Site Comparison among Depositional Contexts	128
Frank's Ruin Cores: Room Context.....	130
Frank's Ruin Cores: Plaza Context.....	132
Frank's Ruin Cores: Midden Context	132
Frank's Ruin Cores: Site.....	133
Frank's Ruin Tools: Room Context.....	135
Frank's Ruin Tools: Plaza Context.....	138
Frank's Ruin Tools: Midden Context	140
Frank's Ruin Tools: Site	143
Frank's Ruin Discussion	146

CHAPTER 8

PUEBLO DE LA MESA INTRA-SITE ANALYSES	148
Introduction.....	148
Pueblo de la Mesa Debitage: Room Cortex Cover	148
Pueblo de la Mesa Debitage: Room Size Class	151
Pueblo de la Mesa Debitage: Room Summary	154
Pueblo de la Mesa Debitage: Plaza Cortex Cover	154
Pueblo de la Mesa Debitage: Plaza Size Class	157
Pueblo de la Mesa Debitage: Plaza Summary	160
Pueblo de la Mesa Debitage: Midden Cortex Cover	160
Pueblo de la Mesa Debitage: Midden Size Class.....	163
Pueblo de la Mesa Debitage: Midden Summary	166
Pueblo de la Mesa Debitage: Site Cortex Cover.....	167
Pueblo de la Mesa Debitage: Site Size Class.....	170
Pueblo de la Mesa Debitage: Intra-Site Comparison among Depositional Contexts	174
Pueblo de la Mesa Cores: Room Context	175
Pueblo de la Mesa Cores: Plaza Context	176
Pueblo de la Mesa Cores: Midden Context.....	177
Pueblo de la Mesa Cores: Site	178
Pueblo de la Mesa Tools: Room Context	180
Pueblo de la Mesa Tools: Plaza Context.....	183
Pueblo de la Mesa Tools: Midden Context.....	187
Pueblo de la Mesa Tools: Site.....	190
Pueblo de la Mesa Discussion.....	193

CHAPTER
FRANK'S
Int

Inter-

CHAPTER 10
CONCLUSION

APPENDIX A

APPENDIX B

APPENDIX C

APPENDIX D

APPENDIX E

APPENDIX F

APPENDIX G

APPENDIX H

APPENDIX I

BIBLIOGRAPHY

CHAPTER 9	
FRANK'S RUIN AND PUEBLO DE LA MESA INTER-SITE COMPARISON	195
Introduction	195
Inter-Site Debitage: Local Raw Materials from Room Contexts	196
Inter-Site Debitage: Local Raw Materials from Plaza Contexts	199
Inter-Site Debitage: Local Raw Materials from Midden Contexts	200
Inter-Site Debitage: Local Raw Materials from the Sites	201
Inter-Site Debitage: Near-Local Raw Materials from Room Contexts ...	203
Inter-Site Debitage: Near-Local Raw Materials from Plaza Contexts	204
Inter-Site Debitage: Near-Local Raw Materials from Midden Contexts ..	205
Inter-Site Debitage: Near-Local Raw Materials from the Sites	206
Inter-Site Debitage: Non-Local Raw Materials from the Sites	207
Inter-Site Core Curation Level Comparison	209
Inter-Site Tool Comparisons	212
Inter-Site Tool Comparison: Local Raw Materials	214
Inter-Site Tool Comparison: Near-Local Raw Materials	216
Inter-Site Tool Comparison: Non-Local Raw Materials	219
Inter-Site Tool Comparison: Depositional Context	221
Inter-Site Comparison Discussion	225
CHAPTER 10	
CONCLUSION	229
APPENDIX A	237
APPENDIX B	245
APPENDIX C	264
APPENDIX D	279
APPENDIX E	300
APPENDIX F	312
APPENDIX G	315
APPENDIX H	338
APPENDIX I	359
BIBLIOGRAPHY	363

LIST OF TABLES

Table 3.1: Glaze Ware Dates for the Salinas Region.....	24
Table 4.1: Pueblo de la Mesa Excavation Units	35
Table 4.2: Frank's Ruin Excavation Units	35
Table 4.3: Raw Material Categories	40
Table 5.1: Variables Recorded for Stone Tools.....	55
Table 5.2: List of Tool Types and Curation Level.....	57
Table 5.3: Morphological Features of Curation Levels	60
Table 5.4: List of Core Types and Curation Levels.....	62
Table 5.5: Stone Tool Condition and Completeness Factor	63
Table 5.6: Debitage Variables.....	66
Table 5.7: Mass Analysis Size Classes with English Approximations.....	73
Table 5.8: Dorsal Cortex Classes.....	76
Table 6.1: Completeness Factor Corrected Artifact Frequency for Frank's Ruin and Pueblo de la Mesa	84
Table 6.2: Artifact Density for Frank's Ruin and Pueblo de la Mesa.....	84
Table 6.3: Intra-Site Chi-Square Comparison of Completeness Factor Corrected Artifact Frequencies Among the Depositional Contexts at Frank's Ruin.....	85
Table 6.4: Intra-Site Chi-Square Comparison of Completeness Factor Corrected Artifact Frequencies Among the Depositional Contexts at Pueblo de la Mesa	85
Table 6.5: Inter-Site Chi-Square Comparison of Completeness Factor Corrected Artifact Frequencies from Room Context at Frank's Ruin and Pueblo de la Mesa	86
Table 6.6: Inter-Site Chi-Square Comparison of Completeness Factor Corrected Artifact Frequencies from Plaza Context at Frank's Ruin and Pueblo de la Mesa	86
Table 6.7: Inter-Site Chi-Square Comparison of Completeness Factor Corrected Artifact Frequencies from Midden Context at Frank's Ruin and Pueblo de la Mesa	86

Table 6.8: Frequency of Raw Material Types by Artifact Type for Frank's Ruin and Pueblo de la Mesa	88
Table 6.9: Relative Frequency of Raw Material Types by Artifact Type at Frank's Ruin and Pueblo de la Mesa	88
Table 6.10: Chi-Square Comparison of Raw Material Types at Frank's Ruin and Pueblo de la Mesa	89
Table 6.11: Completeness Factor Corrected Frequency of Raw Material Proximity Types by Artifact Type at Frank's Ruin and Pueblo de la Mesa.....	90
Table 6.12: Completeness Factor Corrected Relative Frequency of Raw Material Proximity Types by Artifact Type at Frank's Ruin and Pueblo de la Mesa	90
Table 6.13: Chi-Square Comparison of the Raw Material Proximity Types by Completeness Factor Corrected Artifact Type at Frank's Ruin	92
Table 6.14: Chi-Square Comparison of the Raw Material Proximity Types by Completeness Factor Corrected Artifact Type at Pueblo de la Mesa	93
Table 6.15: Chi-Square Comparison of the Raw Material Proximity Types for the Debitage at Frank's Ruin and Pueblo de la Mesa	94
Table 6.16: Chi-Square Comparison of the Raw Material Proximity Types for the Completeness Factor Corrected Cores at Frank's Ruin and Pueblo de la Mesa	94
Table 6.17: Chi-Square Comparison of the Raw Material Proximity Types for the Completeness Factor Corrected Tools at Frank's Ruin and Pueblo de la Mesa	94
Table 6.18: Completeness Factor Corrected Frequency of Tool and Core Types by Raw Material Type at Frank's Ruin.....	96
Table 6.19: Tool and Core Type Completeness Factor Corrected Frequencies at Frank's Ruin.....	98
Table 6.20: Completeness Factor Corrected Frequency of Tool and Core Types by Raw Material Type at Pueblo de la Mesa	100
Table 6.21: Tool and Core Type Completeness Factor Corrected Frequencies at Pueblo de la Mesa	101
Table 7.1: Frequency of Cortex Cover Classes by Raw Material Type for Frank's Ruin Room Debitage	104

Table 7.2:
Frank's F

Table 7.3:
Proximity

Table 7.4:
Debitage ..

Table 7.5:
Room Deb

Table 7.6: C
for Frank's

Table 7.7: F
Plaza Debita

Table 7.8: Fr
Frank's Ruin

Table 7.9: Ch
Proximity Typ

Table 7.10: Fr
Debitage

Table 7.11: Fre
Plaza Debitage

Table 7.12: Chi
for Frank's Ruin

Table 7.13: Freq
Midden Debitage

Table 7.14: Freq
Frank's Ruin Mic

Table 7.15: Chi-S
Proximity Type f

Table 7.16: Freq
Debitage

Table 7.2: Frequency of Cortex Cover Classes by Raw Material Proximity Type for Frank's Ruin Room Debitage	105
Table 7.3: Chi-Square Comparison of the Cortex Cover Classes by Raw Material Proximity Type for Frank's Ruin Room Debitage	106
Table 7.4: Frequency of Size Classes by Raw Material Type for Frank's Ruin Room Debitage	107
Table 7.5: Frequency of Size Classes by Raw Material Proximity Type for Frank's Ruin Room Debitage	107
Table 7.6: Chi-Square Comparison of the Size Classes by Raw Material Proximity Type for Frank's Ruin Room Debitage.....	109
Table 7.7: Frequency of Cortex Cover Classes by Raw Material Type for Frank's Ruin Plaza Debitage	110
Table 7.8: Frequency of Cortex Cover Classes by Raw Material Proximity Type for Frank's Ruin Plaza Debitage	110
Table 7.9: Chi-Square Comparison of the Cortex Cover Classes by Raw Material Proximity Type for Frank's Ruin Plaza Debitage.....	112
Table 7.10: Frequency of Size Classes by Raw Material Type for Frank's Ruin Plaza Debitage	113
Table 7.11: Frequency of Size Classes by Raw Material Proximity Type for Frank's Ruin Plaza Debitage	113
Table 7.12: Chi-Square Comparison of the Size Classes by Raw Material Proximity Type for Frank's Ruin Plaza Debitage.....	114
Table 7.13: Frequency of Cortex Cover Classes by Raw Material Type for Frank's Ruin Midden Debitage.....	116
Table 7.14: Frequency of Cortex Cover Classes by Raw Material Proximity Type for Frank's Ruin Midden Debitage.....	116
Table 7.15: Chi-Square Comparison of the Cortex Cover Classes by Raw Material Proximity Type for Frank's Ruin Midden Debitage.....	117
Table 7.16: Frequency of Size Classes by Raw Material Type for Frank's Ruin Midden Debitage	118

Table 7.17: Midden Debitage

Table 7.18: for Frank's Ruin

Table 7.19: Debitage

Table 7.20: Frank's Ruin

Table 7.21: Proximity Type

Table 7.22: Debitage

Table 7.23: Debitage

Table 7.24: Chi-square for Frank's Ruin

Table 7.25: Chi-square for Frank's Ruin

Table 7.26: Summary Types across each

Table 7.27: Complete Material Type for

Table 7.28: Complete Material Proximity

Table 7.29: Chi-Square Core Curation Level

Table 7.30: Complete Material Type for

Table 7.31: Complete Material Proximity

Table 7.17: Frequency of Size Classes by Raw Material Proximity Type for Frank's Ruin Midden Debitage.....	118
Table 7.18: Chi-Square Comparison of the Size Classes by Raw Material Proximity Type for Frank's Ruin Midden Debitage.....	120
Table 7.19: Frequency of Cortex Cover Classes by Raw Material Type for Frank's Ruin Debitage.....	122
Table 7.20: Frequency of Cortex Cover Classes by Raw Material Proximity Type for Frank's Ruin Debitage.....	122
Table 7.21: Chi-Square Comparison of the Cortex Cover Classes by Raw Material Proximity Type for Frank's Ruin Debitage.....	124
Table 7.22: Frequency of Size Classes by Raw Material Type for Frank's Ruin Debitage.....	124
Table 7.23: Frequency of Size Classes by Raw Material Proximity Type for Frank's Ruin Debitage.....	124
Table 7.24: Chi-Square Comparison of the Size Classes by Raw Material Proximity Type for Frank's Ruin Debitage.....	127
Table 7.25: Chi-Square Comparison of the Size Classes by Raw Material Proximity Type for Frank's Ruin Debitage.....	127
Table 7.26: Summary of the Chi-Square Comparisons of the Raw Material Proximity Types across each of the Depositional Contexts at Frank's Ruin.....	129
Table 7.27: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Type for Frank's Ruin Room Cores.....	131
Table 7.28: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Proximity Type for Frank's Ruin Room Cores.....	131
Table 7.29: Chi-Square Comparison of the Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Proximity Type for Frank's Ruin Room Cores.....	131
Table 7.30: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Type for Frank's Ruin Plaza Cores.....	132
Table 7.31: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Proximity Type for Frank's Ruin Plaza Cores.....	132

Table 7.3:
Material
Table 7.3:
Material

Table 7.3:
Material

Table 7.35:
Material

Table 7.36:
Core Curati

Table 7.37:
Material Typ

Table 7.38:
Material Prox

Table 7.39:
Material Type

Table 7.40:
Material Proxi

Table 7.41:
Material Type

Table 7.42:
Material Proxim

Table 7.43:
Material Type fo

Table 7.44:
Material Proximi

Table 7.45: Chi-S
Tool Curation Lev

Table 8.1: Freque
Mesa Room Debi

Table 8.2: Freque
Pueblo de la Mesa

Table 7.32: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Type for Frank's Ruin Midden Cores	133
Table 7.33: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Proximity Type for Frank's Ruin Midden Cores	133
Table 7.34: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Type for Frank's Ruin Cores.....	134
Table 7.35: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Proximity Type for Frank's Ruin Cores.....	134
Table 7.36: Chi-Square Comparison of the Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Proximity Type for Frank's Ruin Cores	135
Table 7.37: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Type for Frank's Ruin Room Tools	136
Table 7.38: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Proximity Type for Frank's Ruin Room Tools	136
Table 7.39: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Type for Frank's Ruin Plaza Tools	138
Table 7.40: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Proximity Type for Frank's Ruin Plaza Tools	139
Table 7.41: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Type for Frank's Ruin Midden Tools.....	141
Table 7.42: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Proximity Type for Frank's Ruin Midden Tools.....	142
Table 7.43: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Type for Frank's Ruin Tools	144
Table 7.44: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Proximity Type for Frank's Ruin Tools	144
Table 7.45: Chi-Square Comparison of the Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Proximity Type for Frank's Ruin Tools	146
Table 8.1: Frequency of Cortex Cover Classes by Raw Material Type for Pueblo de la Mesa Room Debitage.....	149
Table 8.2: Frequency of Cortex Cover Classes by Raw Material Proximity Type for Pueblo de la Mesa Room Debitage.....	149

Table 8.3:
Proximity

Table 8.4:
Debitage

Table 8.5:
Mesa Room

Table 8.6:
for Pueblo

Table 8.7: Fr
Mesa Plaza

Table 8.8: Fr
Pueblo de la

Table 8.9: CH
Proximity Ty

Table 8.10: Fr
Plaza Debitage

Table 8.11: Fr
Mesa Plaza De

Table 8.12: Ch
for Pueblo de la

Table 8.13: Fre
Mesa Midden D

Table 8.14: Fre
Pueblo de la Me

Table 8.15: Chi-
Proximity Type 1

Table 8.16: Fre
Midden Debitage

Table 8.17: Fre
Mesa Midden Deh

Table 8.3: Chi-Square Comparison of the Cortex Cover Classes by Raw Material Proximity Type for Pueblo de la Mesa Room Debitage	150
Table 8.4: Frequency of Size Classes by Raw Material Type for Pueblo de la Mesa Room Debitage	151
Table 8.5: Frequency of Size Classes by Raw Material Proximity Type for Pueblo de la Mesa Room Debitage.....	151
Table 8.6: Chi-Square Comparison of the Size Classes by Raw Material Proximity Type for Pueblo de la Mesa Room Debitage	153
Table 8.7: Frequency of Cortex Cover Classes by Raw Material Type for Pueblo de la Mesa Plaza Debitage.....	154
Table 8.8: Frequency of Cortex Cover Classes by Raw Material Proximity Type for Pueblo de la Mesa Plaza Debitage.....	155
Table 8.9: Chi-Square Comparison of the Cortex Cover Classes by Raw Material Proximity Type for Pueblo de la Mesa Plaza Debitage	156
Table 8.10: Frequency of Size Classes by Raw Material Type for Pueblo de la Mesa Plaza Debitage	157
Table 8.11: Frequency of Size Classes by Raw Material Proximity Type for Pueblo de la Mesa Plaza Debitage.....	157
Table 8.12: Chi-Square Comparison of the Size Classes by Raw Material Proximity Type for Pueblo de la Mesa Plaza Debitage	160
Table 8.13: Frequency of Cortex Cover Classes by Raw Material Type for Pueblo de la Mesa Midden Debitage	161
Table 8.14: Frequency of Cortex Cover Classes by Raw Material Proximity Type for Pueblo de la Mesa Midden Debitage	161
Table 8.15: Chi-Square Comparison of the Cortex Cover Classes by Raw Material Proximity Type for Pueblo de la Mesa Midden Debitage	163
Table 8.16: Frequency of Size Classes by Raw Material Type for Pueblo de la Mesa Midden Debitage.....	164
Table 8.17: Frequency of Size Classes by Raw Material Proximity Type for Pueblo de la Mesa Midden Debitage	164

Table 8.1:
for Pueblo de

Table 8.2:
Mesa De

Table 8.2.1:
Pueblo de

Table 8.2.1.1:
Proximity

Table 8.2.2:
Debitage ...

Table 8.2.3:
Mesa Debitage

Table 8.2.4:
for Pueblo de

Table 8.2.5: S
Material Prox
Mesa.....

Table 8.2.6: Su
Proximity Typ

Table 8.2.7: Co
Material Type

Table 8.2.8: Co
Material Proxim

Table 8.2.9: Com
Material Type f

Table 8.30: Com
Material Proxim

Table 8.31: Comp
Material Type for

Table 8.32: Comp
Material Proxim

Table 8.18: Chi-Square Comparison of the Size Classes by Raw Material Proximity Type for Pueblo de la Mesa Midden Debitage.....	166
Table 8.19: Frequency of Cortex Cover Classes by Raw Material Type for Pueblo de la Mesa Debitage	167
Table 8.20: Frequency of Cortex Cover Classes by Raw Material Proximity Type for Pueblo de la Mesa Debitage.....	167
Table 8.21: Chi-Square Comparison of the Cortex Cover Classes by Raw Material Proximity Type for Pueblo de la Mesa Debitage.....	169
Table 8.22: Frequency of Size Classes by Raw Material Type for Pueblo de la Mesa Debitage	170
Table 8.23: Frequency of Size Classes by Raw Material Proximity Type for Pueblo de la Mesa Debitage	170
Table 8.24: Chi-Square Comparison of the Size Classes by Raw Material Proximity Type for Pueblo de la Mesa Debitage	173
Table 8.25: Summary of the Chi-Square Comparisons of Cortex Cover Classes by Raw Material Proximity Types across each of the Depositional Contexts at Pueblo de la Mesa.....	174
Table 8.26: Summary of the Chi-Square Comparisons of Size Classes by Raw Material Proximity Types across each of the Depositional Contexts at Pueblo de la Mesa	175
Table 8.27: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Type for Pueblo de la Mesa Room Cores.....	176
Table 8.28: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Proximity Type for Pueblo de la Mesa Room Cores.....	176
Table 8.29: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Type for Pueblo de la Mesa Plaza Cores.....	177
Table 8.30: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Proximity Type for Pueblo de la Mesa Plaza Cores.....	177
Table 8.31: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Type for Pueblo de la Mesa Midden Cores.....	178
Table 8.32: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Proximity Type for Pueblo de la Mesa Midden Cores.....	178

Table 8.33:
Material Type

Table 8.34:
Material Pro

Table 8.35:
Core Curation

Table 8.36:
Material Type

Table 8.37:
Material Prox

Table 8.38: Chi-
Tool Curation
Tools

Table 8.39: Co
Material Type

Table 8.40: Co
Material Proxim

Table 8.41: Chi-
Tool Curation L
Tools

Table 8.42: Com
Material Type for

Table 8.43: Comp
Material Proximit

Table 8.44: Comp
Material Type for

Table 8.45: Comp
Material Proximit

Table 8.46: Chi-S
Tool Curation Le

Table 9.1: Summar
la Mesa Local Deh

Table 8.33: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Type for Pueblo de la Mesa Cores	178
Table 8.34: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Proximity Type for Pueblo de la Mesa Cores	179
Table 8.35: Chi-Square Comparison of the Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Proximity Type for Pueblo de la Mesa Cores...	179
Table 8.36: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Type for Pueblo de la Mesa Room Tools.....	180
Table 8.37: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Proximity Type for Pueblo de la Mesa Room Tools.....	181
Table 8.38: Chi-Square Comparison of the Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Proximity Type for Pueblo de la Mesa Room Tools	183
Table 8.39: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Type for Pueblo de la Mesa Plaza Tools.....	184
Table 8.40: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Proximity Type for Pueblo de la Mesa Plaza Tools.....	184
Table 8.41: Chi-Square Comparison of the Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Proximity Type for Pueblo de la Mesa Plaza Tools	186
Table 8.42: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Type for Pueblo de la Mesa Midden Tools	187
Table 8.43: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Proximity Type for Pueblo de la Mesa Midden Tools	188
Table 8.44: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Type for Pueblo de la Mesa Tools.....	190
Table 8.45: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Proximity Type for Pueblo de la Mesa Tools.....	190
Table 8.46: Chi-Square Comparison of the Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Proximity Type for Pueblo de la Mesa Tools ...	193
Table 9.1: Summary Table for the Chi-Square Comparisons between Frank's Ruin and Pueblo de la Mesa Local Debitage	197

Table 9.2: Su
la Mesa Near-

Table 9.3: Su
la Mesa Non-

Table 9.4: Su
Ruin and Pue

Table 9.5: Su
between Fran

Table 9.6: Sum
Curated Tool
Materials

Table 9.7: Sum
between Frank

Table 9.8: Sum
Curated Tool F
Raw Materials

Table 9.9: Sum
between Frank

Table 9.10: Sum
Curated Tool Fr
Raw Materials...

Table 9.11: Sum
Pueblo de la Mes

Table 9.12: Sum
Curated Tool Fre
Contexts for All P

Table A.1: Frank

Table A.2: Puebl

Table A.3: Raw

Table A.4: Stone

Table A.5: Flake

Table 9.2: Summary Table for the Chi-Square Comparisons between Frank's Ruin and Pueblo de la Mesa Near-Local Debitage.....	203
Table 9.3: Summary Table for the Chi-Square Comparisons between Frank's Ruin and Pueblo de la Mesa Non-Local Debitage.....	207
Table 9.4: Summary Table for the Chi-Square and Fisher's Exact Tests between Frank's Ruin and Pueblo de la Mesa Core.....	210
Table 9.5: Summary Table of the Chi-Square Comparisons of Tool Curation Levels between Frank's Ruin and Pueblo de la Mesa for Local Raw Materials.....	214
Table 9.6: Summary Table of the Fisher's Exact Test Comparing the Expedient and Curated Tool Frequencies between Frank's Ruin and Pueblo de la Mesa for Local Raw Materials	215
Table 9.7: Summary Table of the Chi-Square Comparisons of Tool Curation Levels between Frank's Ruin and Pueblo de la Mesa for Near-Local Raw Materials.....	216
Table 9.8: Summary Table of the Fisher's Exact Test Comparing the Expedient and Curated Tool Frequencies between Frank's Ruin and Pueblo de la Mesa for Near-Local Raw Materials	216
Table 9.9: Summary Table of the Chi-Square Comparisons of Tool Curation Levels between Frank's Ruin and Pueblo de la Mesa for Non-Local Materials.....	219
Table 9.10: Summary Table of the Fisher's Exact Test Comparing the Expedient and Curated Tool Frequencies between Frank's Ruin and Pueblo de la Mesa for Non-Local Raw Materials	220
Table 9.11: Summary Table for the Chi-Square Comparisons between Frank's Ruin and Pueblo de la Mesa All Types by Depositional Context.....	221
Table 9.12: Summary Table of the Fisher's Exact Test Comparing the Expedient and Curated Tool Frequencies between the Frank's Ruin and Pueblo de la Mesa Depositional Contexts for All Raw Material Types.....	221
Table A.1: Frank's Ruin (LA-9032) Excavation Units	237
Table A.2: Pueblo de la Mesa (LA-2091) Excavations Units	238
Table A.3: Raw Material Types.....	238
Table A.4: Stone Colors.....	239
Table A.5: Flake Condition.....	240

Table A.6: T

Table A.7: D

Table A.8: In

Table A.9: Tc

Table A.10: T

Table B.1: Fra

Table B.2: Puc

Table B.3: Rav

Table B.4: Stor

Table B.5: Arti

Table B.6: Con

Table B.7: Type

Table B.8: Dors

Table B.9: Initia

Table B.10: Terr

Table B.11: Typ

Table B.12: Terr

Table B.13: Exis

Table B.14: Exis

Table B.15: Left

Table B.16: Terr

Table B.17: Exist

Table B.18: Exist

Table A.6: Type of Flake (Old)	241
Table A.7: Dorsal Cortex Cover	241
Table A.8: Initiation Type.....	242
Table A.9: Termination Type	242
Table A.10: Type of Flake (New).....	243
Table B.1: Frank's Ruin (LA-9032) Excavation Units.....	245
Table B.2: Pueblo de la Mesa (LA-2091) Excavation Units	246
Table B.3: Raw Material Types	247
Table B.4: Stone Colors.....	247
Table B.5: Artifact Type	248
Table B.6: Condition.....	251
Table B.7: Type of Flake (Old).....	251
Table B.8: Dorsal Cortex Cover	252
Table B.9: Initiation	252
Table B.10: Termination Type.....	252
Table B.11: Type of Flake (New)	253
Table B.12: Termination Type Code	255
Table B.13: Existence of Trampling Damage Code	255
Table B.14: Existence of Purposeful Grinding Code.....	256
Table B.15: Left Margin Shape Code	256
Table B.16: Termination Type Code	257
Table B.17: Existence of Trampling Damage Code	257
Table B.18: Existence of Purposeful Grinding Code.....	257

Table B.1

Table B.2

Table B.2

Table B.22

Table B.23

Table B.24

Table B.25

Table B.26

Table B.27

Table B.28

Table B.29

Table B.30

Table C.1: Fr

Table C.2: Pue

Table C.3: Raw

Table C.4: Stone

Table C.5: Dorsa

Table C.6: Condi

Table C.7: Project

Table C.8: Flake

Table C.9: Type

Table C.10: Base

Table C.11: Haft

Table B.19: Right Margin Shape Code.....	258
Table B.20: Termination Type Code	258
Table B.21: Existence of Trampling Damage Code	259
Table B.22: Existence of Purposeful Grinding Code.....	260
Table B.23: Distal Margin Shape Code	260
Table B.24: Termination Type Code	261
Table B.25: Existence of Trampling Damage Code	261
Table B.26: Existence of Purposeful Grinding Code.....	261
Table B.27: Proximal Margin Shape Code	262
Table B.28: Overall Shape of Tool Code.....	262
Table B.29: Transverse Shape Code.....	263
Table B.30: Longitudinal Shape Code.....	263
Table C.1: Frank's Ruin (LA-9032) Excavations Units	264
Table C.2: Pueblo de la Mesa (LA-2091) Excavation Units	265
Table C.3: Raw Material Code	266
Table C.4: Stone Color	266
Table C.5: Dorsal Cortex Code.....	267
Table C.6: Condition Code	267
Table C.7: Projectile Point Type Code	268
Table C.8: Flake Type (Old) Code	268
Table C.9: Type of Flake (New) Code.....	269
Table C.10: Base Shape Code.....	270
Table C.11: Haft Base Shape Code.....	271

Table C.12: E

Table C.13: S

Table C.14: B

Table C.15: T

Table C.16: E

Table C.17: L

Table C.18: T

Table C.19: E

Table C.20: R

Table C.21: O

Table C.22: T

Table C.23: L

Table C.24: S

Table C.25: B

Table D.1: Frank

Table E.1: Frank

Table E.2: Frank

Table E.3: Frank

Table F.1: Frank

Table F.2: Frank

Table F.3: Frank

Table G.1: Puebl

Table H.1: Puebl

Table C.12: Existence of Purposeful Grinding Code.....	271
Table C.13: Shoulder Shape Code.....	272
Table C.14: Blade Shape Code.....	273
Table C.15: Termination Type Code.....	273
Table C.16: Existence of Trampling Damage Code.....	274
Table C.17: Left Margin Shape Code.....	274
Table C.18: Termination Type Code.....	275
Table C.19: Existence of Trampling Damage Code.....	275
Table C.20: Right Margin Shape Code.....	276
Table C.21: Overall Shape of Tool Code.....	276
Table C.22: Transverse Shape Code.....	277
Table C.23: Longitudinal Shape Code.....	277
Table C.24: Symmetry Code.....	278
Table C.25: Blade Flaking Pattern Code.....	278
Table D.1: Frank's Ruin Debitage (All Variables).....	279
Table E.1: Frank's Ruin Stone Tools (Variables 1 – 19).....	301
Table E.2: Frank's Ruin Stone Tools (Variables 20 – 38).....	305
Table E.3: Frank's Ruin Stone Tools (Variables 39-56).....	309
Table F.1: Frank's Ruin Projectile Point (Variables 1-19).....	313
Table F.2: Frank's Ruin Projectile Point (Variables 20 -38).....	314
Table F.3: Frank's Ruin Projectile Point (Variables 39 -57).....	315
Table G.1: Pueblo de la Mesa Debitage (All Variables).....	316
Table H.1: Pueblo de la Mesa Stone Tools (Variables 1 -19).....	339

Table H.2: Pue

Table H.3: Pue

Table I.1: Pueb

Table I.2: Pueb

Table I.3: Pueb

Table H.2: Pueblo de la Mesa Stone Tools (Variables 20-38)	346
Table H.3: Pueblo de la Mesa Stone Tools (Variables 39-56)	353
Table I.1: Pueblo de la Mesa Projectile Points (Variables 1 – 19)	360
Table I.2: Pueblo de la Mesa Projectile Points (Variables 20 – 38)	361
Table I.3: Pueblo de la Mesa Projectile Points (Variables 39-57)	362

Figure 2.1: S

Figure 2.2: P

Figure 3.1: P

Figure 3.2: F

Figure 6.1: R
Frank's Ruin

Figure 6.2: R
Pueblo de la N

Figure 7.1: Co
Material Type

Figure 7.2: Co
Material Proxim

Figure 7.3: Size
Material Type...

Figure 7.4: Size
Material Proxim

Figure 7.5: Corte
Material Type....

Figure 7.6: Corte
Material Proxim

Figure 7.7: Size C
Material Type.....

Figure 7.8: Size C
Material Proxim:

Figure 7.9: Corte
Material Type....

Figure 7.10: Cor
Raw Material Pr

LIST OF FIGURES

Figure 2.1: Study Area.....	11
Figure 2.2: Pueblos in the Salinas Region	17
Figure 3.1: Pueblo de la Mesa	24
Figure 3.2: Frank's Ruin.....	28
Figure 6.1: Relative Frequency of Raw Material Proximity Types by Artifact Type at Frank's Ruin.....	91
Figure 6.2: Relative Frequency of Raw Material Proximity Types by Artifact Type at Pueblo de la Mesa	91
Figure 7.1: Cortex Cover Relative Frequency for Frank's Ruin Room Debitage by Raw Material Type.....	105
Figure 7.2: Cortex Cover Relative Frequency for Frank's Ruin Room Debitage by Raw Material Proximity Type.....	106
Figure 7.3: Size Class Relative Frequency for Frank's Ruin Room Debitage by Raw Material Type.....	108
Figure 7.4: Size Class Relative Frequency for Frank's Ruin Room Debitage by Raw Material Proximity Type.....	108
Figure 7.5: Cortex Cover Relative Frequency for Frank's Ruin Plaza Debitage by Raw Material Type.....	111
Figure 7.6: Cortex Cover Relative Frequency for Frank's Ruin Plaza Debitage by Raw Material Proximity Type.....	111
Figure 7.7: Size Class Relative Frequency for Frank's Ruin Plaza Debitage by Raw Material Type.....	113
Figure 7.8: Size Class Relative Frequency for Frank's Ruin Plaza Debitage by Raw Material Proximity Type.....	114
Figure 7.9: Cortex Cover Relative Frequency for Frank's Ruin Midden Debitage by Raw Material Type.....	116
Figure 7.10: Cortex Cover Relative Frequency for Frank's Ruin Midden Debitage by Raw Material Proximity Type	117

Figure 7.11:
Material Ty

Figure 7.12:
Material Pro

Figure 7.13:
Material Typ

Figure 7.14:
Material Prox

Figure 7.15: S
Type

Figure 7.16: S
Proximity Typ

Figure 7.17: C
Frank's Ruin R

Figure 7.18: C
Frank's Ruin R

Figure 7.19: C
Frank's Ruin P

Figure 7.20: C
Frank's Ruin P

Figure 7.21: C
Frank's Ruin M

Figure 7.22: C
Frank's Ruin M

Figure 7.23: C
Frank's Ruin T

Figure 7.24: C
Frank's Ruin T

Figure 8.1: C
Raw Material T

Figure 7.11: Size Class Relative Frequency for Frank's Ruin Midden Debitage by Raw Material Type.....	119
Figure 7.12: Size Class Relative Frequency for Frank's Ruin Midden Debitage by Raw Material Proximity Type.....	119
Figure 7.13: Cortex Cover Relative Frequency for Frank's Ruin Debitage by Raw Material Type.....	123
Figure 7.14: Cortex Cover Relative Frequency for Frank's Ruin Debitage by Raw Material Proximity Type.....	123
Figure 7.15: Size Class Relative Frequency for Frank's Ruin Debitage by Raw Material Type	125
Figure 7.16: Size Class Relative Frequency for Frank's Ruin Debitage by Raw Material Proximity Type	126
Figure 7.17: Completeness Factor Corrected Relative Frequency of Curation Levels for Frank's Ruin Room Tools by Raw Material Type.....	136
Figure 7.18: Completeness Factor Corrected Relative Frequency of Curation Levels for Frank's Ruin Room Tools by Raw Material Proximity Type.....	137
Figure 7.19: Completeness Factor Corrected Relative Frequency of Curation Levels for Frank's Ruin Plaza Tools by Raw Material Type.....	139
Figure 7.20: Completeness Factor Corrected Relative Frequency of Curation Levels for Frank's Ruin Plaza Tools by Raw Material Proximity Type.....	140
Figure 7.21: Completeness Factor Corrected Relative Frequency of Curation Levels for Frank's Ruin Midden Tools by Raw Material Type.....	142
Figure 7.22: Completeness Factor Corrected Relative Frequency of Curation Levels for Frank's Ruin Midden Tools by Raw Material Proximity Type.....	143
Figure 7.23: Completeness Factor Corrected Relative Frequency of Curation Levels for Frank's Ruin Tools by Raw Material Type	145
Figure 7.24: Completeness Factor Corrected Relative Frequency of Curation Levels for Frank's Ruin Tools by Raw Material Proximity Type	145
Figure 8.1: Cortex Cover Relative Frequency for Pueblo de la Mesa Room Debitage by Raw Material Type	149

Figure 8.2: C
Raw Material

Figure 8.3: S
Material Type

Figure 8.4: S
Material Prox

Figure 8.5: C
Raw Material

Figure 8.6: C
Raw Material

Figure 8.7: Siz
Material Type

Figure 8.8: Siz
Material Proxim

Figure 8.9: Cor
Raw Material T

Figure 8.10: Co
by Raw Material

Figure 8.11: Siz
Raw Material Ty

Figure 8.12: Siz
Raw Material Pro

Figure 8.13: Cor
Material Type....

Figure 8.14: Cor
Material Proxim

Figure 8.15: Siz
Material Type....

Figure 8.16: Siz
Material Proxim

Figure 8.2: Cortex Cover Relative Frequency for Pueblo de la Mesa Room Debitage by Raw Material Proximity Type	150
Figure 8.3: Size Class Relative Frequency for Pueblo de la Mesa Room Debitage by Raw Material Type.....	152
Figure 8.4: Size Class Relative Frequency for Pueblo de la Mesa Room Debitage by Raw Material Proximity Type.....	153
Figure 8.5: Cortex Cover Relative Frequency for Pueblo de la Mesa Plaza Debitage by Raw Material Type	155
Figure 8.6: Cortex Cover Relative Frequency for Pueblo de la Mesa Plaza Debitage by Raw Material Proximity Type	156
Figure 8.7: Size Class Relative Frequency for Pueblo de la Mesa Plaza Debitage by Raw Material Type.....	158
Figure 8.8: Size Class Relative Frequency for Pueblo de la Mesa Plaza Debitage by Raw Material Proximity Type.....	159
Figure 8.9: Cortex Cover Relative Frequency for Pueblo de la Mesa Midden Debitage by Raw Material Type	162
Figure 8.10: Cortex Cover Relative Frequency for Pueblo de la Mesa Midden Debitage by Raw Material Proximity Type	162
Figure 8.11: Size Class Relative Frequency for Pueblo de la Mesa Midden Debitage by Raw Material Type	164
Figure 8.12: Size Class Relative Frequency for Pueblo de la Mesa Midden Debitage by Raw Material Proximity Type	165
Figure 8.13: Cortex Cover Relative Frequency for Pueblo de la Mesa Debitage by Raw Material Type.....	168
Figure 8.14: Cortex Cover Relative Frequency for Pueblo de la Mesa Debitage by Raw Material Proximity Type.....	168
Figure 8.15: Size Class Relative Frequency for Pueblo de la Mesa Debitage by Raw Material Type.....	171
Figure 8.16: Size Class Relative Frequency for Pueblo de la Mesa Debitage by Raw Material Proximity Type.....	172

Figure 8.
Pueblo de

Figure 8.
Pueblo de

Figure 8.1
Pueblo de

Figure 8.2
Pueblo de

Figure 8.2
Pueblo de

Figure 8.22
Pueblo de la

Figure 8.23:
Pueblo de la

Figure 8.24:
Pueblo de la

Figure 9.1: In
Local Raw M

Figure 9.2: Int
Raw Materials

Figure 9.3: Inte
Raw Materials

Figure 9.4: Inter
Local Raw Mate

Figure 9.5: Inter
Raw Materials ...

Figure 9.6: Inter
Local Raw Mate

Figure 9.7: Inter
Local Raw Mate

Figure 8.17: Completeness Factor Corrected Relative Frequency of Curation Levels for Pueblo de la Mesa Room Tools by Raw Material Type	182
Figure 8.18: Completeness Factor Corrected Relative Frequency of Curation Levels for Pueblo de la Mesa Room Tools by Raw Material Proximity Type	182
Figure 8.19: Completeness Factor Corrected Relative Frequency of Curation Levels for Pueblo de la Mesa Plaza Tools by Raw Material Type	185
Figure 8.20: Completeness Factor Corrected Relative Frequency of Curation Levels for Pueblo de la Mesa Plaza Tools by Raw Material Proximity Type	185
Figure 8.21: Completeness Factor Corrected Relative Frequency of Curation Levels for Pueblo de la Mesa Midden Tools by Raw Material Type	188
Figure 8.22: Completeness Factor Corrected Relative Frequency of Curation Levels for Pueblo de la Mesa Midden Tools by Raw Material Proximity Type	189
Figure 8.23: Completeness Factor Corrected Relative Frequency of Curation Levels for Pueblo de la Mesa Tools by Raw Material Type.....	191
Figure 8.24: Completeness Factor Corrected Relative Frequency of Curation Levels for Pueblo de la Mesa Tools by Raw Material Proximity Type.....	192
Figure 9.1: Inter-site Comparison of the Relative Frequency of Cortex Cover Classes for Local Raw Materials in Room Context	198
Figure 9.2: Inter-site Comparison of the Relative Frequency of Size Classes for Local Raw Materials in Room Context.....	198
Figure 9.3: Inter-site Comparison of the Relative Frequency of Size Classes for Local Raw Materials in Plaza Context.....	200
Figure 9.4: Inter-site Comparison of the Relative Frequency of Cortex Cover Classes for Local Raw Materials	202
Figure 9.5: Inter-site Comparison of the Relative Frequency of Size Classes for Local Raw Materials	202
Figure 9.6: Inter-site Comparison of the Relative Frequency of Size Classes for Near-Local Raw Materials for Plaza Context	205
Figure 9.7: Inter-site Comparison of the Relative Frequency of Size Classes for Near-Local Raw Materials	206

Figure 9.8: Inter
Local Raw Mate

Figure 9.9: Rela
de la Mesa for L

Figure 9.10: Rel
Frank's Ruin and

Figure 9.11: Rel
at Frank's Ruin

Figure 9.12: Rel
at Frank's Ruin

Figure 9.13: Rel
Frank's Ruin and

Figure 9.14: Rel
from Room Con

Figure 9.15: Rel
from Plaza Con

Figure 9.16: Rel
Midden Context

Figure 9.17: Rel
Frank's Ruin and

Figure 9.8: Inter-site Comparison of the Relative Frequency of Size Classes for Non-Local Raw Materials	209
Figure 9.9: Relative Frequency of the Core Curation Levels at Frank's Ruin and Pueblo de la Mesa for Local and Near-Local Raw Material Proximity Types.....	211
Figure 9.10: Relative Frequency of Tool Curation Levels for Local Raw Materials at Frank's Ruin and Pueblo de la Mesa	215
Figure 9.11: Relative Frequency of Tool Curation Levels for Near-Local Raw Materials at Frank's Ruin and Pueblo de la Mesa for the Plaza Context.....	217
Figure 9.12: Relative Frequency of Tool Curation Levels for Near-Local Raw Materials at Frank's Ruin and Pueblo de la Mesa	218
Figure 9.13: Relative Frequency of Tool Curation Levels for Non-Local Raw Materials at Frank's Ruin and Pueblo de la Mesa	220
Figure 9.14: Relative Frequency of Tool Curation Levels for All Raw Material Types from Room Context at Frank's Ruin and Pueblo de la Mesa	222
Figure 9.15: Relative Frequency of Tool Curation Levels for All Raw Material Types from Plaza Context at Frank's Ruin and Pueblo de la Mesa	223
Figure 9.16: Relative Frequency of Tool Curation Levels for All Raw Materials from Midden Context at Frank's Ruin and Pueblo de la Mesa	224
Figure 9.17: Relative Frequency of Tool Curation Levels for All Raw Material Types at Frank's Ruin and Pueblo de la Mesa	225

Chapter 1: Introduction

The context

used to signify

sites (Mera 1994)

period, they have

2004:137). The

question, as it

interactions.

This the

technology at the

"Jumanos cluster"

Ruin (LA-9032)

immediately prior

15th century. The

tools and debitage

procurement, use

evaluation of intr

before the fluores

This work

the development

historical contri

archaeology. Me

of analytical app

Chapter 1: Introduction

The concept of “settlement clusters” in Southwestern archaeology has long been used to signify spatially distinct groups of economically and/or socially related habitation sites (Mera 1940). Though settlement clusters were common during the protohistoric period, they have been identified as early as Basketmaker III times (Spielmann 2004:137). The genesis and nature of settlement clusters is an important research question, as it informs on the scale, intensity, and character of regional (and sub-regional) interactions.

This thesis compares the intra- and inter-site organization of chipped stone technology at two contemporaneous pueblos located within the boundaries of the “Jumanos cluster” in the Salinas region of central New Mexico. Both pueblos, Frank’s Ruin (LA-9032) and Pueblo de la Mesa (LA-2091), were occupied and abandoned immediately prior to the development of the distinct protohistoric Jumanos cluster in the 15th century. The goal of this study is to use a high resolution analysis of chipped stone tools and debitage from the two pueblos to assess the similarities and differences in the procurement, use, and discard of chipped stone implements. This will then allow for an evaluation of intra- and inter-pueblo social and economic organization during the time before the florescence of the Jumanos cluster.

This work aids in the understanding of the conditions and processes involved in the development of the Jumanos cluster, making important theoretical and cultural historical contributions to Salinas prehistory and more generally to Southwestern archaeology. Methodologically, this research will interest lithic specialists as a number of analytical approaches are employed to make robust arguments concerning the

organization of
dissimilar, which
interpreting the
archaeological c
the precontact p
an understudied
Levine 1987).

Organization of

An outline
chapters. The ge
study's objective
to provide a broad
in full.

Chapter 2

prehistoric and p
importance in the
population aggre
occupied, but the
the overall Salin
2000). There ha
population reorg
secure land tenu
regions (Spielma

organization of lithic technology. The abandonment of the two sites was notably dissimilar, which requires that the importance of formation processes be considered when interpreting the results of the analysis. Finally, there has been relatively sparse archaeological coverage of the Salinas region. This lack of research is especially true for the precontact period, so this research will help to contribute to an understudied period in an understudied region of the Southwest (Stuart and Gauthier 1981:318-325; Tainter and Levine 1987).

Organization of Research

An outline of the research is provided here through a synopsis of each of the chapters. The goal of this synopsis is to make clear the logic of the study, identify the study's objectives, explain the analytical approach used to address these objectives, and to provide a broad overview of the research before the specific components are dealt with in full.

Chapter 2 outlines the environmental setting for the study area, as well as the prehistoric and protohistoric culture history of the Salinas region. Of particular importance in this chapter is the discussion of the successive stages of increasing population aggregation. Through time it appears that fewer habitation sites were occupied, but the high number of rooms found at protohistoric village sites suggests that the overall Salinas population remained stable (Caperton 1981; Mera 1940; Rautman 2000). There have been a number of possible causes identified for this regional population reorganization including environmental downturns, warfare, the need to secure land tenure, and pressure associated with increased immigration into neighboring regions (Spielmann 1996).

It is c

Jumanos clu

inhabitants o

Blanco, and E

were distincti

1988). Despi

have been a nu

range and inter

and Spielmann

important econ

and Spielmann

This pat

Jumanos cluster

economic differ

for the research

this thesis aims t

be detected at tw

which involved

Chapter 3

employed at bot

Ruin and Puebl

case for equitabl

elucidate the typ

It is during the protohistoric period that we see the formation of the distinct Jumanos cluster. Ethnohistorical and archaeological research suggests that the inhabitants of the four Jumanos cluster pueblos (Gran Quivira, Pueblo Pardo, Pueblo Blanco, and Pueblo Colorado) had linguistic, cultural, and material cultural practices that were distinctive from the other contemporaneous Salinas pueblos (Hayes 1981a; Ivey 1988). Despite the similarities among the Jumanos cluster pueblos themselves, there have been a number of material cultural dissimilarities identified among them in the range and intensity of extra-regional economic interactions (Graves 2004, 2005; Graves and Spielmann 2000). These material differences suggest that there may have been some important economic differences among the pueblos within the Jumanos cluster (Graves and Spielmann 2000).

This pattern of increasing aggregation through time, the distinctive nature of the Jumanos cluster pueblos compared to the other Salinas pueblos, and the possible economic differences among these pueblos are all topics that postdate the cultural context for the research question in this thesis. Using these factors as the framework, however, this thesis aims to assess the extent to which these protohistoric economic differences can be detected at two pre-Jumanos cluster pueblos, at least concerning those interactions which involved chipped stone tools.

Chapter 3 provides a discussion of the archaeological field methodologies employed at both sites, along with an overview of the occupational histories at Frank's Ruin and Pueblo de la Mesa. The objectives of this chapter are fourfold: 1) to make a case for equitable comparison of the archaeological datasets from the pueblos, 2) to elucidate the type and quality of information available in these datasets, 3) to identify

similarities b
occupations c
the chapter. w
assemblages.

The ex
same principa
best possible s
same types of
ensuring that th
and quality of t
archaeological
degree of prove

The occu
are generally eq
(year-round habi
Period), site layo
cluster area). Ba
comparison can b

Despite a
differences. Alt
Jumanos cluster.
Pueblo de la Me
Frank's Ruin is t

similarities between the occupations at the pueblos, and 4) to identify differences in the occupations of the pueblos. Each of these objectives contributes to the ultimate goal of the chapter, which is to provide a basis and justification for comparing the two lithic assemblages.

The excavations at Frank's Ruin and Pueblo de la Mesa were conducted by the same principal investigator using nearly identical field methodologies, making for the best possible scenario for inter-site comparisons (Rautman 1995, 2008). Furthermore, the same types of areas within the pueblos (i.e. rooms, plazas, and middens) were excavated, ensuring that the assemblages came from equitable depositional contexts. The quantity and quality of the data attained from both sites are commensurate with modern research archaeological methods, resulting in a high resolution of data acquisition and a high degree of provenience precision.

The occupational similarities between the two pueblos are striking. Both pueblos are generally equivalent in size (70-100 rooms), environmental setting (upland), function (year-round habitation), period of occupation (Early Masonry Period/Early Late Masonry Period), site layout (plaza-oriented), and location (within the protohistoric Jumanos cluster area). Based on these similarities, a strong case for meaningful archaeological comparison can be made.

Despite all of the similarities between the pueblos, there are also some important differences. Although both pueblos are located within the area of the protohistoric Jumanos cluster, they are situated near different protohistoric pueblos within that cluster. Pueblo de la Mesa is geographically quite close to Pueblo Colorado and Pueblo Blanco. Frank's Ruin is further to the west, more closely associated spatially with Gran Quivira

and Pueblo F

length of occ

affects on the

(see Cameron

Chapt

sites. Also ex

the lithic artifi

dimensions ar

which are the

the lithic assem

chipped stone t

material type to

understanding c

providing insigh

In Chapt

utilized in this st

relevant data. Th

organization of l

approach toward

ideological, politi

lithic raw materi

tools (Nelson 19

and Pueblo Pardo. The second substantive difference between the two pueblos is the length of occupation and the mode of abandonment, both of which can have important affects on the type, quantity, and distribution of artifacts found at an archaeological site (see Cameron 1990; Diehl 1998; Schiffer 1983, 1985).

Chapter 4 addresses the strategy used to draw comparable samples from both sites. Also explicated in this chapter are the two analytical dimensions used in grouping the lithic artifacts: depositional context and lithic raw material type. The analytical dimensions are essentially units of analysis which will be used for aggregating artifacts, which are the units of observation, for the purpose of making comparisons. Comparing the lithic assemblages across these analytical dimensions allows for patterns in the chipped stone tool and debitage data that are sensitive to spatial contexts and/or raw material type to be identified. These analytical dimensions offer a more nuanced understanding of the degree of similarity between the site assemblages, while also providing insights into the potential causes for variability.

In Chapter 5 the theoretical and methodological framework for the lithic analyses utilized in this study are explained, as are the laboratory methods employed to collect the relevant data. This research seeks to detect and understand differences in the organization of lithic technology between the two sites. An organization of technology approach towards lithic analysis focuses on the cultural factors (e.g. economic, social, ideological, political) and environmental factors (e.g. resource type, resource seasonality, lithic raw material distribution) that structure the procurement, use, and discard of stone tools (Nelson 1991).

Com

assemblages

fundamental

Bamforth 19

1989). Curat

of use, effect

manufacture t

are minimally

need, were lig

(Bamforth 198

Though

morphological

level of tool cur

and resharpenin

working edge pr

through which th

this research the

from highly cura

tools in each of

technology betw

material type.

The debi

the prevalence of

Comparing the frequency of curated tools relative to expedient tools in assemblages is an especially useful organizational distinction because of the fundamentally different use-life properties of these tool strategies (Andrefsky 1994; Bamforth 1986; Cowan 1999; Jeske 1992; Parry and Kelly 1987; Young and Harry 1989). Curated tools are typically defined as tools that were manufactured in anticipation of use, effective for a variety of tasks, maintained after use, and modified after initial manufacture to extend their utility (Bamforth 1986). At the other end of the continuum are minimally curated (i.e. expedient) tools which were produced to fulfill an immediate need, were lightly modified, and typically discarded after the task at hand was completed (Bamforth 1986).

Though the concepts associated with the degree of tool curation are abstract, the morphological correlates used to distinguish curated from expedient tools are not. The level of tool curation is best measured through assessing the amount of manufacturing and resharpening effort, as evidenced by the degree of deliberate tool form shaping, working edge preparation, and retouch (Andrefsky 1994). This rubric provides the means through which the degree of curation for individual tools can be assessed. In the case of this research the stone tools are segregated into one of four curation categories ranging from highly curated to minimally curated (i.e. expedient). Based on the frequency of tools in each of these curation levels the overall similarity in the organization of technology between the two pueblos can be assessed by depositional contexts and raw material type.

The debitage analysis provides a complementary line of inquiry for identifying the prevalence of curated or expedient tool strategies at the sites. The analytical approach

applied to

single varia

kinds of lith

represented

is related to

of the early s

flakes derive

stage flakes s

The two uniqu

dimension (i.e

used and meth

assemblages us

refutation) of th

possibilities of t

which are summ

Chapter 6

cursory level con

the composition

two sites allows

use) and similar

necessary to inte

the study.

applied to the debitage is a “unique assemblage” approach, in which the frequency of a single variable within a debitage “population” is used to make generalizations about the kinds of lithic reduction/production behaviors (e.g. core vs. tool, early vs. late stage) represented by that population (Andrefsky 2005:113). Since the level of the tool curation is related to the overall degree of reduction, a debitage population with high frequencies of the early stage flakes indicates a lower level of curation for the tool(s) from which the flakes derived. Using the same logic, debitage populations with high frequencies of late stage flakes suggests the flakes originated from the production of a more curated tool(s). The two unique assemblage debitage variables used in this study are maximum linear dimension (i.e. mass analysis) and dorsal cortex cover, which are two of the most widely used and methodologically robust techniques available. Analyzing the debitage assemblages using these two variables allows for an independent corroboration (or refutation) of the results from the stone tool analysis, strengthening the interpretive possibilities of the research. The predictions for the stone tool and debitage analyses, which are summarized later in this chapter, are also discussed in detail in Chapter 5.

Chapter 6 provides a basic description of the sites’ lithic assemblages as well as a cursory level comparison of artifact frequency and density, lithic raw material use, and the composition of the tool assemblages. These basic levels of comparison between the two sites allows for the identification of differences (e.g. artifact density and raw material use) and similarities (e.g. tool assemblage composition), along with providing the context necessary to interpret the more detailed intra- and inter-site analyses conducted later in the study.

In C

composition

and raw mat

Analysis (ED

statistics, is u

tests of signif

patterns to be

datasets used

variability exh

In Chap

composition of

contexts, as we

question of this

technology betw

The pote

assemblages at t

been abandoned

pueblo. The *de*

event may not ha

de la Mesa appe

falling out of use

the analyses wit

or misinterpretat

In Chapter 7 (Frank's Ruin) and Chapter 8 (Pueblo de la Mesa) the internal composition of the sites' lithic assemblages are analyzed across the depositional contexts and raw material types using the debitage, core, and tool variables. Exploratory Data Analysis (EDA), which utilizes graphical devices (e.g. bar charts) and basic descriptive statistics, is used in these chapters as the initial means of identifying patterns. Statistical tests of significance, which are also conducted in the chapters, allow for the strength of patterns to be evaluated. The goal of these chapters is to provide descriptions of the two datasets used in the study, identify initial patterns of interest, and evaluate the level of variability exhibited within the sites, which puts the inter-site variability into context.

In Chapter 9 the debitage, core, and tool variables are used to compare the composition of the lithic assemblages across the raw material types and depositional contexts, as well as at the "site-wide" level. Chapter 9 directly addresses the central question of this thesis regarding the degree of similarity in the organization of lithic technology between the two sites.

The potential affect of the dissimilar abandonment modes on the lithic assemblages at the sites is also discussed in Chapter 9. Frank's Ruin appears to have been abandoned all at once, during a single event that coincided with the burning of the pueblo. The *de facto* floor assemblages found in the pueblo suggest that this burning event may not have been planned, necessitating rapid abandonment. In contrast, Pueblo de la Mesa appears to have been abandoned slowly over time with rooms incrementally falling out of use until the entire pueblo was deserted. Neglecting to frame the results of the analyses within the context of site formation processes could lead to misidentification or misinterpretation of important patterns in the data.

In
organizational

Mesa and Mesa

condition the

is that there

discard of st

stone tool st

suggest that

Possible caus

materials thro

economic acti

activities at th

The soc

protohistoric pe

and thus should

periods (Graves

chipped stone too

the make-up of th

economic milieu

In Chapter 10 the implications of the similarities and differences between the organization of the lithic technology at the two sites is discussed. Since Pueblo de la Mesa and Frank's Ruin were remarkably similar in all of the factors that would logically condition the organization of chipped stone technology, the null hypothesis in this study is that there will be no significant differences observed in the procurement, use, and discard of stone tools between the two pueblos. Significant variability in the chipped stone tool strategies, as indicated by the debitage and/or the stone tool analyses, would suggest that there were significant socioeconomic differences between the pueblos. Possible causes for these differences are disparities in the access to quality lithic raw materials through direct procurement or exchange, variation in the types or intensity of economic activities at the pueblos, and dissimilarities in the spatial organization of activities at the pueblos.

The socioeconomic differences observed between the Jumanos pueblos during the protohistoric period are thought to be the result of the unique conditions of that period and thus should not be operational (at least not at the same scale) during the preceding periods (Graves 2004; Graves and Spielmann 2000). Significant differences in the chipped stone tool strategies between the two pueblos, either as aggregate wholes or in the make-up of their constituent parts, would indicate that the pre-protohistoric social and economic milieu in the Salinas region was more complicated than is currently considered.

Chapter

Environme

The

New Mexico

lakes found

Mountains a

of the region.

dominant land

Tularosa Basin

River Valley.

proximity to th

rest of the South

periods. The Sa

(Ancestral Pueb

This border statu

The gene

broad expanses o

(Hayes 1981a:1)

the Medanos, w

limestone table l

expanses of salt

study does not d

a detailed region

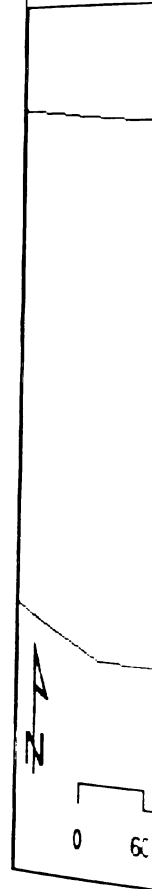
Chapter 2: Environmental Setting and Culture History

Environmental Setting

The two sites in this study are located in the semi-arid Salinas region of central New Mexico (see Figure 2.1). The Spanish name derives from the intermittent alkali lakes found in the Estancia Basin in the northern portion of the region. The Manzano Mountains and Gallinas Mountains, respectively, define the western and eastern extents of the region. Chupadera Mesa, rising approximately 150 m from the lowlands, is the dominant landform in the interior of the region and divides the Estancia Basin from the Tularosa Basin. Further to the west, beyond the Manzano Mountains, is the Rio Grande River Valley. Past the Gallinas Mountains to the east lies the Great Plains. This proximity to the Great Plains is a unique feature of the Salinas region compared to the rest of the Southwest, and was especially significant during the protohistoric and historic periods. The Salinas region is also located at the boundary between the Anasazi (Ancestral Puebloan) “culture area” to the west and north, and the Mogollon to the south. This border status added complexity to the region’s cultural interactions.

The generally flat Estancia Basin lies at roughly 1800 m above sea level and has broad expanses of grasses, accompanied by yucca, saltbush, prickly pear, and cholla (Hayes 1981a:1). The northern portion of the Tularosa Basin is a flat sandy plain called the Medanos, which has vegetation similar to that found in the Estancia Basin. The broad limestone table land of Chupadera Mesa is forested with juniper and pinyon trees, with expanses of saltbush, grasses, and prickly pear throughout. Since the analysis in this study does not deal with a significant cross-chronological or “through time” comparison, a detailed regional paleoclimatic review is unnecessary.

Figure 2.



Culture History

What is

influenced the st

in this section. T

articulating this s

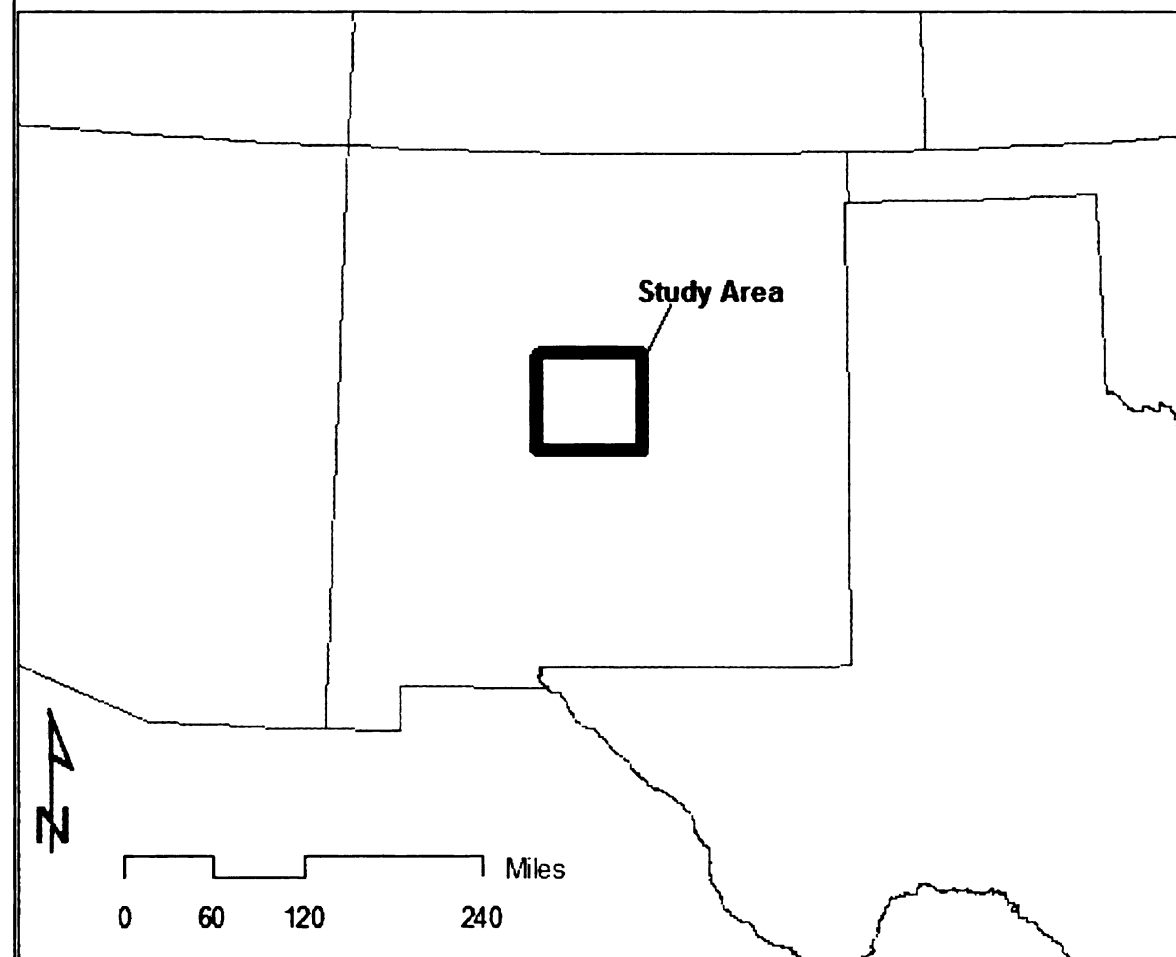
Jumanos cluster

the occupations o

to 1430), and co

aggregations in t

Figure 2.1: Study Area



Culture History

What is known about the late prehistoric period in the Salinas region has greatly influenced the structure of the research proposed in this study, and thus will be reviewed in this section. The purpose of this overview is to explicate the logic behind the study by articulating this specific research design with the broader research question concerning Jumanos cluster development. This overview includes the time periods before and after the occupations of Frank's Ruin (A.D. 1200 to 1350) and Pueblo de la Mesa (A.D. 1260 to 1430), and covers both the Early Masonry Period and Late Masonry Period aggregations in the Salinas region (see Caperton 1981; Graves 2004). It is readily

apparent that the
discussed, espec
that some of the
heterogeneous th
general lack of r
research has add
of the published
Spanish mission

Pithouse

Only thro
(LA-2579 and th
(see Fenega 1956
focused on descr
sites within the g
38448, occupied
strategies, as we
through regional

The Pitho
maize) form a si
pithouse sites su
resources, which
domesticated re

apparent that there is a considerable degree of overlap between the different time periods discussed, especially during the earlier portions of the chronology. This overlap suggests that some of the transitions between the periods were quite long, and likely spatially heterogeneous throughout the region. What is also apparent from this overview is the general lack of research in the region compared to many areas in the Southwest. Recent research has addressed some of the understudied periods in the Salinas region, but much of the published materials focus on either the PaleoIndian period or the excavations at the Spanish mission sites among the large historic period pueblos.

Pithouse Period (A.D 950-1250)

Only three pithouse sites have been excavated in the Salinas region, two of which (LA-2579 and the Gran Quivira pithouse village) were excavated over four decades ago (see Fenega 1956 and Ice 1968, respectively). The reports of these early excavations focused on descriptions of artifacts and architectural features, centering on placing the sites within the general Southwestern chronology. The more recent excavations at LA-38448, occupied from A.D. 980 to A.D. 1260, provided data concerning subsistence strategies, as well as information on how people coped with environmental uncertainty through regional exchange networks during this period (Rautman 1990).

The Pithouse Period in the Salinas region is the first in which cultigens (beans and maize) form a significant proportion of the diet (Rautman 1990). The distribution of pithouse sites suggests that they were positioned to optimize the harvest of wild food resources, which indicates that the Pithouse Period diet was also dependent on non-domesticated resources (Rautman 1990:28). Interestingly, domesticated plants arrived

quite late in t

owing to the

Jacal

It is d

with stone sla

Salinas jacals:

Despite the lac

Period "lifewa

communities w

temporal overl

Caperto

made up of mul

roomblock grou

standardized lay

Salinas habitatio

Mesa reinforced

differences in "s

proximity to wa

(Chamberlain 2)

the pre-aggregat

inter-communit

Period, when tha

quite late in the Salinas region compared to much of the rest of the Southwest, perhaps owing to the peripheral location of the region.

Jacal Period (A.D. 1175-1350)

It is during the Jacal Period that above ground wattle and daub structures (jacals) with stone slab footers first appear in the study area. There has been little excavation of Salinas jacals; most of what is known about the period derives from surface surveys. Despite the lack of intensive research it is likely safe to assume that the general Jacal Period “lifeway” was similar to that of the Pithouse Period, especially since many jacal communities were located adjacent to pithouse villages and there was significant temporal overlap between the two periods (Caperton 1981).

Caperton’s (1981) survey of the region found that jacal communities were usually made up of multiple roomblocks forming I- and L-shapes, but E- and F-shaped roomblock groups were also identified. Importantly, Caperton noted that there was not a standardized layout for jacal communities, which is unlike the pattern found in later Salinas habitation sites. Chamberlin’s (2001) study of jacal communities on Chupedera Mesa reinforced Caperton’s finding, indicating that there may have been important differences in “site size, degree of aggregation, intra-site layout, topographic position, proximity to water, and [proximity to] ritual landscapes” during the Jacal Period (Chamberlain 2001: 2-3). Chamberlin’s work adds complexity to what is known about the pre-aggregation social organization in the study area, indicating that the seeds for inter-community differentiation may have been sown well before the Late Masonry Period, when they become more pronounced.

77

TH

region and

structures

masonry and

standardiza

plaza-orient

is unclear if

significant ch

Early

During

oriented trend

pueblo during

around a centra

Rautman (2000)

indicative of a c

the region-wide

public spaces wi

unclear but wart

brought on by in

downturns have

Rautman

(LA-199) show

Transitional Period (Late A.D. 1200s)

The Transitional Period overlapped the earlier and later periods in the Salinas region and was likely short lived (Caperton 1981; Rautman 2000:272). Transitional structures were made of a mix of jacal architectural elements with some elements of masonry and adobe block construction (Caperton 1981). During this period there was a standardization of habitation site layout throughout the Salinas region, with 50-room, plaza-oriented communities becoming the norm (Caperton 1981; Rautman 2000:272). It is unclear if the shift to more standardized habitation sites was accompanied by significant changes in subsistence or social organization.

Early Masonry Period (Late A.D. 1200s through Middle A.D. 1300s)

During the Early Masonry Period, habitation site layout continued the plaza-oriented trend found during the Transitional Period (Chamberlin 2001). The typical pueblo during this period consisted of multiple masonry or adobe roomblocks arranged around a central plaza, forming a rectangle (Rautman 2000; Spielmann 1996:180). Rautman (2000) sees the transition to plaza-oriented adobe and masonry pueblos as indicative of a coping strategy employed to mitigate the affects of aggregation caused by the region-wide reorganization of communities through the incorporation of integrative public spaces within pueblos. The cause of the Early Masonry Period reorganization is unclear but warfare, securing access to arable land and wild food resources, pressure brought on by increased immigration into neighboring regions, and environmental downturns have all been implicated (Spielmann 1996).

Rautman's (2000) excavation at the Early Masonry Period site of Kite Pueblo (LA-199) shows that the plaza-oriented layout was the original form of the pueblo,

indicating t

the plaza-on

relatively un

Periods on C

aggregation

immigrants (

Some

evidence to su

shift; instead

including less

agriculture. Th

studies (Roczek

have varied as

The relationship

pithouse-to-pue

nuances of the p

it is clear that the

Late Ma

The Late

abandonment of

consolidating in

Spielmann 1996

were occupied d

indicating that a cohesive community was in place before construction began, rather than the plaza-orientation being the product of ad hoc additive construction. Based on the relatively uniform total room counts between the Jacal, Transitional, and Early Masonry Periods on Chupadera Mesa (in the southwestern portion of the region) it appears that the aggregation likely involved re-organization of local peoples rather than an influx of immigrants (Chamberlin 2001; Rautman 2000).

Some researchers (e.g. Gilman 1987) have used ethnographic and archaeological evidence to suggest that the pithouse-to-pueblo transition was more than an architectural shift; instead involving more profound shifts in settlement and subsistence patterns including less residential mobility, higher population density, and a greater reliance on agriculture. This traditional interpretation of the shift has been challenged by recent studies (Rocek 1995), which suggest that the degree of reliance on agriculture may not have varied as much as previously assumed between the pithouse and pueblo periods. The relationships between mobility, settlement size, and subsistence on either side of the pithouse-to-pueblo transition were likely not uniform across the Southwest. While the nuances of the pithouse-to-pueblo transition in the Salinas region are poorly understood, it is clear that there was a cultural continuity between the two periods.

Late Masonry Period (A.D. 1400-1450)

The Late Masonry Period aggregation in the Salinas region involved the abandonment of most Early Masonry Period pueblos, with existing populations consolidating into much larger 25-30 roomblock, multi-story pueblos (Graves 2004:43; Spielmann 1996:185). Of the nineteen known Early Masonry Period pueblos, only nine were occupied during the Late Masonry Period (Spielmann 1996:183). Like the earlier

period of as

further coal

response to

land tenure c

Spielmann 2

Most

arrival of the

for the histori

remaining com

evidence for a

Located

comprised of th

Pueblo Blanco

occupied until t

1500s (Graves 2

linguistically an

(Graves 2004:43

Tompiro, the lan

pueblos (Chilili

the inhabitants o

adornment whic

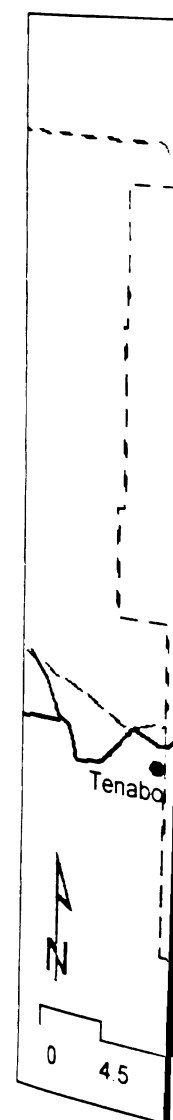
Spaniards (Ivey

period of aggregation, the Late Masonry Period aggregation appears to have involved the further coalescence of local communities. This consolidation was likely an indigenous response to significant immigration into neighboring regions which necessitated securing land tenure over productive croplands and the need for mutual defense (Spielmann 1994; Spielmann 2004:140-142).

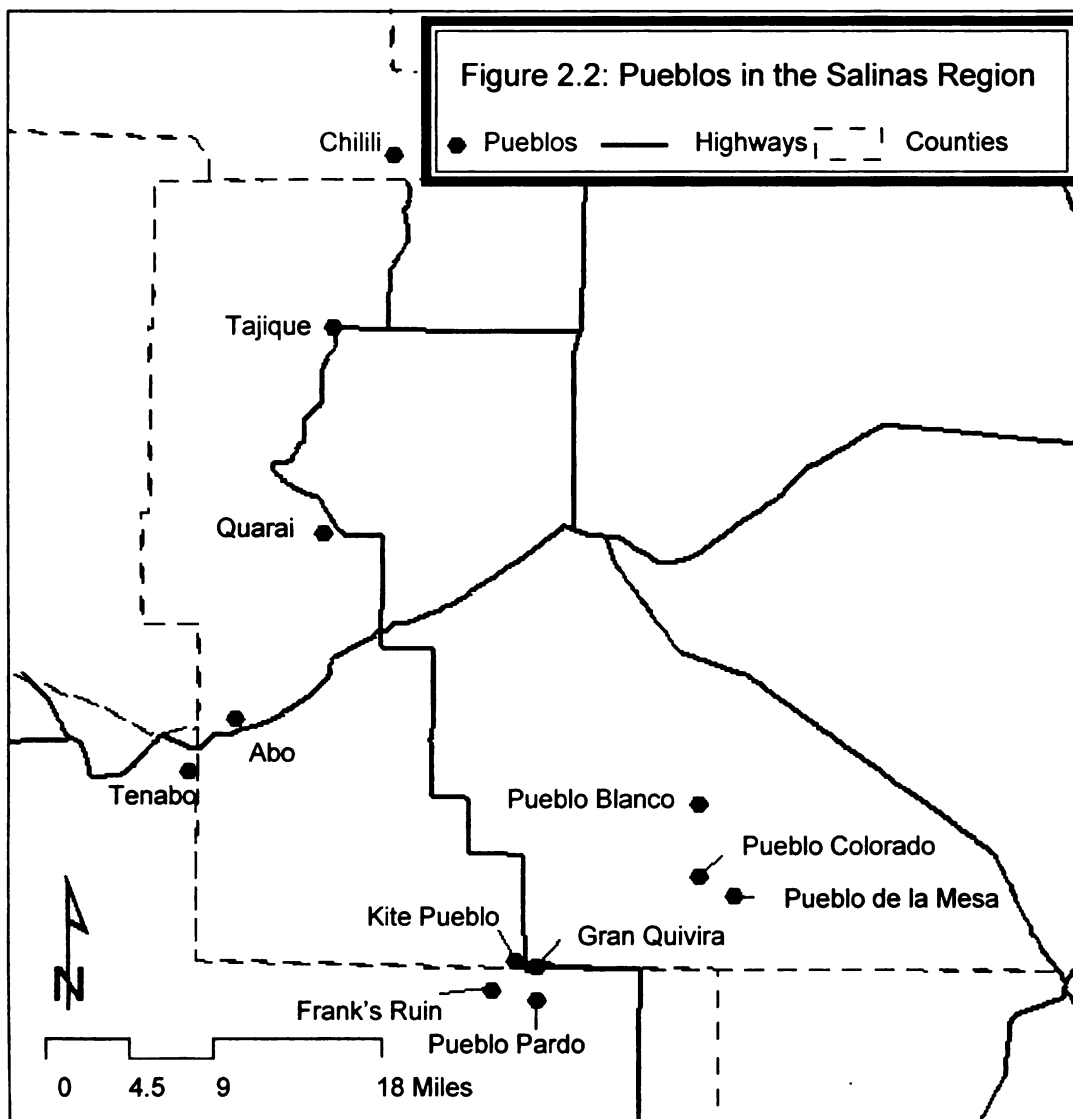
Most of these Late Masonry Period pueblos would remain occupied until the arrival of the Spanish in the Salinas region, beginning around A.D. 1580, which allows for the historical record to inform on the social and economic organization of these remaining communities (Ivey 1988). It is from these early records that we first see evidence for a unique social identity within the “Jumanos cluster.”

Located in the southern portion of the Salinas region, the Jumanos cluster was comprised of the pueblo communities of Gran Quivira (“Las Humanas”), Pueblo Pardo, Pueblo Blanco (“Tabira”), and Pueblo Colorado (see Figure 2.2). The first three were occupied until the 1670s, while Pueblo Colorado was abandoned during the middle A.D. 1500s (Graves 2004:43). The three historically occupied pueblos were differentiated linguistically and culturally by the Spanish from the other pueblos in the Salinas region (Graves 2004:43; Hayes 1981a:1; Ivey 1988:13). The peoples in these pueblos spoke Tompiro, the language spoken at Abo and Tenabo, but not the other northern Salinas pueblos (Chilili, Tajique, Quarai) (Hayes 1981b:7). The name “Jumanos” was given to the inhabitants of the Jumanos cluster because of their distinctive tattooing and body adornment which bore a resemblance to that of a Plains tribe also called Jumanos by the Spaniards (Ivey 1988:13). James Ivey, an ethnohistorian, suggests that the Jumanos

cluster peoples have
intermarriage and
1988:14). The J
during the Late
influence through
even the other T
cluster.



cluster peoples had close ties with Plains groups. These close ties likely involved intermarriage and integration of Plains peoples into daily social life at the pueblos (Ivey 1988:14). The Jumanos cluster pueblos' proximity to the Plains was certainly influential during the Late Masonry Period. The Spanish acknowledged the intensity of this influence through differentiating the Jumanos cluster from the other Salinas pueblos, even the other Tompiro speaking Salinas pueblos, which speaks to the distinctness of this cluster.



The an

cremated man

and not found

1944). Archae

distinct materi

region pueblos

(e.g. Chupoden

form in the oth

Mera 1940). In

Jumanos pueblo

unique social id

Recent r

social interaction

(2000), Graves

distance trade ge

obsidian were no

competition amo

of goods procure

may have been i

Graves and Spic

sociopolitical or

relationships, pu

prestige." Put a

The archaeological evidence suggests that the inhabitants of the Jumanos pueblos cremated many of their dead, an interment practice that was rare across the Southwest and not found at the other Salinas pueblos (Graves 2004:43; Hayes 1981b:12; Toulouse 1944). Archaeological excavations at the four Jumanos pueblos indicate that there were distinct material culture differences between these pueblos and the rest of the Salinas region pueblos. The four Jumanos pueblos retained the black-on-white ceramic tradition (e.g. Chupadero black-on-white) well after glaze wares became the dominant ceramic form in the other pueblos, and more generally across the Southwest (Graves 2004:45; Mera 1940). In addition to these ethnohistorical and archaeological indicators, the four Jumanos pueblos form a spatially discrete cluster reinforcing the notion that they shared a unique social identity.

Recent research at the Jumanos pueblos elaborates on the nature of economic and social interactions within and outside of the Jumanos cluster. Graves and Spielmann (2000), Graves (2004), and Graves (2005) have all found that the acquisition of long-distance trade goods such as Rio Grande glaze ware ceramics, bison meat and hides, and obsidian were not uniform between the Jumanos pueblos indicating a degree of economic competition among the pueblos. There were also differences in the type and proportions of goods procured throughout the occupations of the pueblos demonstrating that there may have been intra-cluster differences in pueblo power and prestige (Graves 2004; Graves and Spielmann 2000). Graves (2004:51) notes that the Jumanos cluster sociopolitical organization was, "characterized by two potentially opposing sets of relationships, pueblo [cluster] autonomy and [intra-cluster] differences in power and prestige." Put another way, the distinct Jumanos cluster social identity was not solely

characterized by “boundary-marking” strategies such as spatial differentiation and unique social practices (i.e. language, burial practices, and ceramic traditions), it was also marked by economic competition among the pueblos through asymmetrical interactions with outside groups (i.e. exchange partners)(Chamberlin 2006).

Summary and Discussion

There has been a great deal of work focusing on the Late Masonry Period and Historic Period occupations of the Jumanos cluster pueblos, but there has been limited research on the earlier pueblos in the area. The two Early Masonry Period pueblos analyzed here represent the best data available for studying this earlier occupational period. This study of the similarities or differences in the organization of lithic technology between two earlier pueblos will shed light on pre-Jumanos cluster economic similarities and differences. Chamberlin’s (2001) study of the Jacal Period occupation shows that there were some important economic differences between communities even before the first masonry pueblos were constructed. Since the pattern of increasing aggregation through time seems to involve the indigenous population of the area, this research will be a good test of the early existence (and persistence) of economic differences in the Jumanos cluster area, especially those activities recorded in the use of chipped stone tools.

Chapter 3: Occupations and Excavations at Pueblo de la Mesa and Frank's Ruin

Introduction

The previous chapter outlined the environmental setting and general cultural history for the Salinas region. In this chapter, the specific occupational histories of the two sites analyzed in this study are discussed to identify similarities and differences between the pueblos. These similarities and differences will then be used to structure the expectations and interpretation of the lithic assemblage comparison.

Excavation Methodology

Before the discussion on occupational histories begins, an overview of the excavation methodology employed at both sites is necessary. The excavations were overseen by Dr. Alison Rautman of Michigan State University who carried out the work under the auspices of the university's archaeological field school. One of the primary objectives of the excavations was to delineate the architectural form and internal layout of the pueblos, and develop a chronology for construction phases at the sites. As a result, the areas within the bounds of the architecture (i.e. rooms and internal plaza) were the principal focus of the excavations, although there was some testing of extramural middens (Rautman 1995, 2008).

The excavation methodology at both sites was nearly identical. After an initial stage of removing surface vegetation and rubble, the upper portions of walls were exposed in portions of the pueblo. A metric survey grid was superimposed over the site to delineate excavation units that were not defined by architectural features (i.e. walls). Where architectural features were present, they were used to demarcate excavation units. Often pueblo rooms were too large (frequently more than 2 m on a side) to feasibly

excavate in a single unit, in which case they were subdivided into two and sometimes four excavation subunits in order to maintain tight spatial provenience of features and artifacts.

Once excavations commenced, natural and cultural strata, when present, were used to determine the excavation levels. As is often the case in pueblos, much of the archaeological deposits at the sites were made up of undifferentiated rubble, wall fall, and adobe melt (puddled adobe). When defined strata were absent, 10 cm arbitrary levels were used to guide excavations. The arbitrary levels were also used within the natural and cultural strata if these layers were more than 10 cm thick. Few non-architectural features (e.g. burials, cache pits, hearths, etc.) were found at either site, but when these features were encountered they were excavated separate from adjacent strata. Since the identification of architectural features was fundamental to the research program at both sites, excavations usually terminated after the final floor in a room was exposed.

The excavated deposits were passed through a $\frac{1}{4}$ " screen in order to identify small artifacts. Artifacts that were large or distinct enough to discover before screening were often piece-plotted to preserve the best possible provenience. Two-liter soil samples were taken from every stratigraphic level and all of the excavated features at the sites. These soil samples, taken in order to analyze botanical remains as well as small artifacts ($< \frac{1}{4}$ "), were processed in the field laboratory using a portable float machine, resulting in the separation of "heavy fraction" from the "light fraction." At the time of this research the analysis of both the heavy and the light fraction materials was ongoing for Frank's Ruin and Pueblo de la Mesa. An eight-ounce soil sample was also taken from the southwest corner of every excavated level as well as every feature. These soil samples,

taken for the pur

Mesa but the Fra

research.

During th

provide in-field s

(lithics, ceramics

Descriptions of s

composition (per

provenience-level

piece-plotted arti

Photographs wer

the descriptions i

After exc

profiles were pre

Photographs of t

drawn maps.

This brie

and Frank's Run

of the data avail

field methods us

site comparisons

also identical) is

methodology reg

taken for the purpose of comparative pollen analysis, have been analyzed for Pueblo de la Mesa but the Frank's Ruin materials were still awaiting analysis at the time of this research.

During the excavation of each unit, "provenience-level forms" were filled out to provide in-field summaries for all of the levels (Rautman 2008). Field counts of artifacts (lithics, ceramics, bones, shells, and botanicals) were included for each form. Descriptions of sediment color (Munsell Color System), degree of compaction, grain size composition (percentage of clay, silt, sand, and rock) were noted on the forms. The provenience-level forms also included plan view maps of features and the locations of piece-plotted artifacts for each level, as well as general observations made by excavators. Photographs were taken of notable excavation levels and features in order to supplement the descriptions in the provenience-level forms.

After excavations concluded for each unit, maps of the east and north wall profiles were prepared, as well as plan view maps of the final excavated level. Photographs of the wall profiles and level plan views were also taken to supplement the drawn maps.

This brief summary of the excavation procedure employed at Pueblo de la Mesa and Frank's Ruin should give the reader a general notion about the quantity and quality of the data available for this research. Of principal importance is the nearly identical field methods used at both sites, which eliminates one important source of error in inter-site comparisons. A discussion of the chipped stone analytical procedures (which were also identical) is in Chapter 5. While datasets deriving from different excavation methodology regimes are not *a priori* incomparable, there are certain concessions (and

assumptions)

regarding field

Pueblo de la M

Excava

of 1992 and 19

was to docume

regional environ

Rautman's earl

of environment

aggregation (R

The 100

arranged around

3.1) (Rautman I

appears to have

occupied defens

The radiocarbon

indicating an oc

occupation date

Masonry Period

Glaze A (A.D. 1

was collected fr

Mera's report o

survey of the ar

assumptions) necessary to make a case for equitable comparison. No such concessions regarding field methodology need be made for this research.

Pueblo de la Mesa

Excavations at Pueblo de la Mesa (LA-2091) were carried out during the summers of 1992 and 1993 (Rautman 1992, 1993a, 1995). The primary goal of the excavations was to document the role of exchange and regional interaction at the pueblo in light of regional environmental variability (Rautman 1995). This research was a continuation of Rautman’s earlier work on Ancestral Puebloan communities’ coping mechanisms in light of environmental uncertainty in the period preceding the Early Masonry Period aggregation (Rautman 1993b).

The 100-room masonry pueblo was made up of five, one to two story roomblocks arranged around two plazas, giving the pueblo the appearance of a figure “8” (see Figure 3.1) (Rautman 1995:7). Despite the pueblo’s upland mesa-top location (elev. 2095 m), it appears to have been used as a year-round habitation site, rather than the infrequently occupied defensive refuge suggested by Stuart and Gauthier (1981) (Rautman 1995). The radiocarbon dates matched the expectations of the ceramic seriation at the site, indicating an occupation span of A.D. 1260 to 1430 (Rautman 1995:22). These occupation dates range through the entire Early Masonry Period to beginning of the Late Masonry Period. Nearly all of the glaze ware pottery found during the excavations was Glaze A (A.D. 1315-1425) (see Table 3.1), while one Glaze B (A.D. 1400-1450) sherd was collected from the surface (Rautman 1995:68). Interestingly, these findings echo Mera’s report of Glaze A and Glaze B wares’ presence at the site during his 1930’s survey of the area (Mera 1940). Since only one Glaze B sherd was collected from the

surface of th

de la Mesa v

Table 3.1:

Glaze A

Glaze B

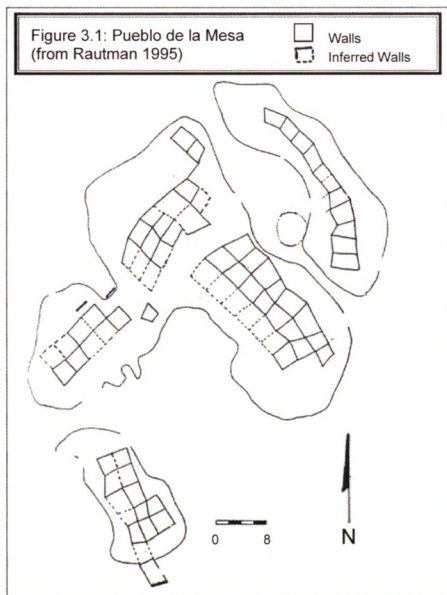
Glaze C

Glaze D

Glaze E

surface of the site in 1995 it seems that much (or perhaps all) of the occupation of Pueblo de la Mesa was during the Glaze A time period (Rautman 1995).

Table 3.1: Glaze Ware Dates for the Salinas Region (from Warren 1981)	
Glaze A	A.D. 1315-1425
Glaze B	A.D. 1400-1450
Glaze C	A.D. 1425-1490
Glaze D	A.D. 1490-1515
Glaze E	A.D. 1515-1650



Based
walls, and the
complicated b
added to the p
refurbished wi
1995:154).

There v
the first phase
second phase F
(Rautman 1995:

Occupation

Based on
sandstone slab
episode. The e
constituted the
Sandstone was
walls of Room
later phase of c
was built after

Once R
bounded on thr
Southwest, and

Based on the superimposition of the floors, the quantity and locations of abutted walls, and the artifact distribution within the rooms, the pueblo seems to have had a fairly complicated building sequence. During this building sequence, entire roomblocks were added to the pueblo, new rooms were added to existing roomblocks, old rooms were refurbished with new floors, and abandoned rooms served as midden locations (Rautman 1995:154).

There were two distinct but overlapping phases of occupation at the site; during the first phase Roomblocks I and II were constructed around the North Plaza, during the second phase Roomblocks III, IV, and V were constructed around the South Plaza (Rautman 1995: 151).

Occupation Phase I

Based on the interlocking position of many of the primarily single course sandstone slab walls, it appears that most of Roomblock II was built during a single episode. The early radiocarbon dates from Roomblock II suggest that this roomblock constituted the initial stage of construction at Pueblo de la Mesa (Rautman 1995:151). Sandstone was also the predominate material used in constructing the double-coursed walls of Roomblock I. Double-coursed masonry walls were commonly used during the later phase of construction at the site which led Rautman to conclude that Roomblock I was built after the construction of Roomblock II (Rautman 1995).

Once Roomblock I was built, the North Plaza became a clearly defined space bounded on three sides by roomblocks. Based on the ethnographic use of plazas in the Southwest, and on the thick and diverse deposits in the midden immediately to the

northwest of
communal ac

There

the removal of
construction.

the smaller of
than a kiva, but

described ciste
has twice the c

multiple prepara
suggest. It is n

emergence hol
debatable. Rad

occupation pha
(1995) suggests

would be availa

Occupation

At the s

to the southwest

using the same

Roomblock III.

chronologically

Roomblock IV

northwest of the plaza, Rautman suggests that the North Plaza was the focus of communal activity at the site (Rautman 1995:151).

There were two “kiva-like” (i.e. round, semi-subterranean) pits formed through the removal of limestone bedrock within the North Plaza during the initial phase of construction, these structures were called Kiva 1 and Kiva 2 (Rautman 1995). Kiva 2 is the smaller of the structures (2 m diameter) and was probably used as a cistern, rather than a kiva, based on its similarities in form to the historically and archaeological described cisterns of Gran Quivira (Hayes 1981b; Howard 1981; Rautman 1995). Kiva 1 has twice the diameter of Kiva 2 and was likely used for a different purpose as the multiple prepared adobe floors, the internal postholes, and post notches in bedrock suggest. It is notable that Kiva 1 lacks some of the features (e.g. sipapu, deflector shield, emergence hole) that are typical of “classic” kivas, making the moniker of “kiva” debatable. Radiocarbon dates indicate that both “kivas” were in use during the first occupation phase at the site, although Kiva 2 was abandoned before Kiva 1. Rautman (1995) suggests that Kiva 1 and Kiva 2 were not contemporaries because little space would be available in the North Plaza if they were.

Occupation Phase II

At the start of the second phase of occupation at the site, Roomblock III was built to the southwest of Roomblock II. Roomblock II was also expanded and remodeled using the same construction material (limestone) and technique as was employed for Roomblock III, which led Rautman to establish that these undertakings occurred chronologically close to each other (Rautman 1995:153). With the later addition of Roomblock IV the South Plaza became a clearly defined space, much like the by then

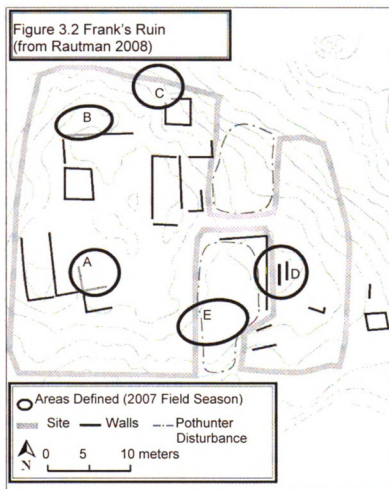
abandoned North Plaza during the first phase of occupation. Unlike the North Plaza there were no kiva-like structures within the South Plaza. The midden deposits in Roomblock I and II suggest that they were abandoned sometime during the occupation of Roomblocks III and IV (Rautman 1995:153).

The final building episode at the site included the addition of jacal-like rooms to Roomblock IV and the construction of a free standing jacal roomblock (Roomblock V) to the southeast of the South Plaza. The thick sheet midden around Roomblock V indicates that it may have been an important location of the economic activities, acting as a sort of ramada for the inhabitants of the Roomblocks III and IV (Rautman 1995: 154). The midden within Roomblock IV is the thinnest at the pueblo, indicating that it was likely the last part of the pueblo to be abandoned. The lack of late glaze ware ceramics at the site suggest that after the abandonment of Roomblock IV there was no substantial reuse, let alone reoccupation of the site (Rautman 1995: 154).

Given this review of the occupation sequence at Pueblo de la Mesa it is clear that the pueblo went through two relatively complicated construction phases which included rearrangements of existing roomblocks, additions of rooms, and the building of entirely new roomblocks. It is impossible to concretely specify exactly which roomblocks were contemporaneous but we can determine the relative building and occupation sequence through referencing of radiocarbon dates, architectural style, midden densities, and the positioning of structures.

Frank's Ruin

Located 25 km to the southwest of Pueblo de la Mesa is Frank's Ruin (LA-9032), which was excavated during the summers of 2007 and 2008¹ (Rautman 2008). The excavations were carried out in order to provide the data necessary to understand the social and economic changes that accompanied the transition to aggregated, plaza-oriented pueblos in the Salinas region (Rautman 2008).



The 70-room pueblo is composed of two large roomblocks, called the East Pueblo and West Pueblo, with the West Pueblo arranged around a central plaza (see Figure 3.2).

Frank's Ruin is positioned in the uplands of Chupadera Mesa (elev. 1963m) and, like

¹ Only the data from 2007 excavations at Frank's Ruin were included for this research.

Pueblo de la Mesa, was a fully functional pueblo. Based on the seriation of ceramics found at the site, Frank's Ruin appears to have been occupied from A.D. 1200 to 1350 (Rautman 2008). Radiocarbon dates from the site were not available to corroborate these dates at the time of this research. However, since the ceramic sequence in the Salinas region is well understood, radiocarbon dates would likely be superfluous.

The West Pueblo portion of the site appears to be the earliest manifestation of Frank's Ruin. The core of this original pueblo was a 50-room single story adobe pueblo arranged around a plaza. Based on the arrangement of adobe rooms it appears that the original pueblo was a "unit-pueblo," that is built in a single episode with the plaza as the focal point of the layout. While adobe pueblos were not common in the uplands of the Salinas region, there were other nearby contemporaneous examples of adobe unit-pueblos, most notably Kite Pueblo (LA-199) (Rautman 2000). Within the plaza was a large (3 m diameter) clay-lined cistern that, due to the amount of debris deposited within it, was likely an early feature at the site (Rautman 2008).

Sometime after the initial construction episode at the site the adobe pueblo was extensively remodeled using limestone masonry. At least one row of rooms was added to the south side and possibly the north side of the pueblo during this building episode. Interestingly the plaza "footprint" remained unaltered, suggesting that the plaza may have served an important function within the community throughout the occupation of the site (see Rautman 2000). A course of masonry was also added to the external western wall of the pueblo, which increased structural integrity and likely accommodated the addition of a second story. Based on the depth of the masonry rubble (1.4 m in places) and the height of the intact adobe wall (1.2 m) it seems reasonable to conclude that the West

Pueblo was two stories high and the second story was constructed of masonry (Rautman 2008). The masonry-atop-adobe walls in the western portion of the West Pueblo (Area A) corroborate this supposition (Rautman 2008:35).

Whether the East Pueblo roomblock was added during this remodeling episode is difficult to determine, but it is clear that the roomblock postdates the adobe construction. Based on the consistency of architectural style between the remodeled West Pueblo areas and the new construction of the East Pueblo it seems probable that they were built during roughly the same time period. One important difference between the roomblocks is that the East Pueblo was clearly a single story, while the West Pueblo was almost certainly two stories after the initial adobe pueblo had been remodeled.

Sometime after the initial construction episode, limestone masonry was used to modify the configuration of rooms in the West Pueblo, most notably to block doors that had existed in the adobe walls. Also at this time, the passageway between the outside and inside of the plaza was restricted through the addition of a masonry wall along the south side of the pueblo. Within this wall a “loophole” (Kenzie 1997), that is a purposeful gap in the masonry from which one could shoot arrows, was constructed suggesting that defense of the pueblo may have been the impetus for some of the masonry remodeling (Rautman 2008: 126).

All of the evidence at Frank’s Ruin points towards a sudden, if not hasty, abandonment following an extensive and intense conflagration at the site. Heavily burnt vigas (roof beams) atop *de facto* floor assemblages (see Schiffer 1983) were found in two areas of the West Pueblo. In one of these areas (Area A) the floor assemblage was on top of a thoroughly oxidized prepared adobe floor, suggesting the roof of the pueblo

collapsed while it was still engulfed in flames. Within these *de facto* assemblages were a number of complete (albeit crushed) bowls and pots, intact stone and bone tools, and dense concentrations of burnt unprocessed maize. Notably there was no evidence of burning in the East Pueblo, indicating that either the fire did not affect the entire pueblo or the East Pueblo was constructed after the inferno.

The intact floor assemblages suggest that the fire that destroyed all of the West Pueblo and most of Frank's Ruin was not initiated by the denizens and possibly was the result of inter-group conflict. One would expect that any and all useful items, including vigas would be removed from a pueblo before a planned abandonment, not left in place to burn. Furthermore, the addition of defensive features like the loophole and the masonry reinforced walls indicate that the possibility of attack was a concern to the inhabitants. Perhaps the burning that is evident at Frank's Ruin was the manifestation of this concern.

Besides the possibility of the post-conflagration construction of the East Pueblo, there is no evidence to suggest that there were any serious attempts to reoccupy the pueblo. The cistern within the plaza did contain burnt fill that appears to have been moved into the void during a "clean-up" episode, but this hardly constitutes a reoccupation. The midden deposits around the entire pueblo were notably sparse, suggesting that the term of occupation at the site may have been quite short and possibly terminated completely after the fire.

Overview of Similarities and Differences: Pueblo de la Mesa and Frank's Ruin

Based on the short descriptions of the occupations at the two sites presented here, a number of important general statements about their similarities and differences can be made. These similarities and differences have significant implications for the

interpretation of the lithic assemblage comparison. Through isolation of the conditional factors that are dissimilar between the pueblos, the possible causes of the variation between the lithic assemblages can be identified. That is not to say that equivalence between particular aspects of archaeological sites (e.g. function, size, form) precludes the possibility of substantive dissimilarities in material culture. However, analysis conducted in any historical science (as opposed to an experimental science) must generalize the similarities of “conditioning” factors between cases, both to justify the comparison and to suggest possible reasons for the differences or patterns in the data.

Both Pueblo de la Mesa and Frank’s Ruin were similar in size (70-100 rooms), environmental setting (upland), function (year-round habitation), period of occupation (Early Masonry/Early Late Masonry Period), site layout (plaza-oriented), and location (within the protohistoric Jumanos cluster area). Thus, a number of conditions are similar and can be viewed as analytically constant.

While both pueblos were located within the boundaries of the Jumanos cluster, they were separated by 25 km and, based solely on proximity, would likely have been the ancestral populations to different protohistoric pueblos (Pueblo de la Mesa to Pueblo Colorado or Pueblo Blanco; Frank’s Ruin to Gran Quivira or Pueblo Pardo). Thus, this study is uniquely suited to evaluate the nature of pre-protohistoric economic interaction in the Jumanos cluster area.

The other major difference between the pueblos concerns the length of occupation and the mode of abandonment. As a number of researchers have pointed out, the occupation length and mode of abandonment can greatly influence the type, kind, condition, and distribution of artifacts left at archaeological sites (see Cameron 1990;

Diehl 1998; S

and abandonn

results of the

Diehl 1998; Schiffer 1983, 1985). The affects of differences in the length of occupation and abandonment processes will be discussed in Chapter 9 within the context of the results of the lithic assemblage comparisons between the two sites.

of the se

dimensi

chipped

and met

framewo

Sampling

In

Ruin and

overall de

assembla

deposits c

sampling

units at P

context. c

for all of

A

to ensure

represent

also prese

location w

² The "Kiva

Chapter 4: Sampling Methodology and Analytical Dimensions

Introduction

The goal of this chapter is twofold: 1) to provide an explanation and justification of the sampling strategies employed at the sites, and 2) to explain the two analytical dimensions (i.e. depositional context and lithic raw material type) used to compare the chipped stone tools and debitage. This chapter precedes the discussion of the theoretical and methodological structure of the lithic analyses in order to provide the contextual framework necessary to understand how the lithic data will be compared.

Sampling of Frank's Ruin and Pueblo de la Mesa

In order to ensure an equitable comparison of the lithic assemblages from Frank's Ruin and Pueblo de la Mesa a sampling strategy had to be employed. Due to the low overall density of artifacts and the limited fieldwork at Frank's Ruin, the entire lithic assemblage was included in this research. The two years of excavations in the denser deposits of Pueblo de la Mesa yielded a much larger assemblage, which necessitated sampling. Figures 3.1 and 3.2 in Chapter 3 display the locations of all of the excavated units at Pueblo de la Mesa and Frank's Ruin. Tables 4.1 and 4.2 list the excavation unit's context, coordinates, and volume, as well as the debitage and tool frequency and density for all of the units included in this analysis.

A stratified random sample of the Pueblo de la Mesa lithic assemblage was drawn to ensure that the three primary depositional contexts (room, plaza, and midden) were represented in large enough quantities to allow for statistically valid comparisons, while also preserving randomness in sample selection². Based on adjacent architecture and location within the pueblo, each excavation unit was classified as one of the three

² The "Kiva 2" units were excluded from the Pueblo de la Mesa sample.

Table 4.1: Pueblo de la Mesa Excavation Units				
Context	Coordinates	Volume	Debitage Frequency (Density)	Tool and Core Frequency (Density)
Room	516E 506N	1.46	51 (34.93)	20 (13.70)
Room	517E 507N	1.53	66 (43.14)	11 (7.19)
Room	520E 537N	0.88	55 (62.50)	30 (34.09)
Room	521E 536N	1.22	80 (65.57)	51 (41.80)
Room Total	n/a	5.09	252 (49.51)	112 (22.00)
Plaza	515E 531N	0.40	86 (215.00)	17 (42.50)
Plaza	507E 537N	0.21	44 (209.52)	15 (71.43)
Plaza	507E 541N	0.55	45 (81.82)	10 (18.18)
Plaza	504E 500N	0.27	48 (177.78)	13 (48.15)
Plaza	517E 496N	0.53	85 (161.60)	17 (32.32)
Plaza	518E 496N	0.75	55 (73.33)	21 (28.00)
Plaza Total	n/a	2.71	363 (134.15)	93 (34.37)
Midden	Test Unit 4-North	0.20	2 (10.00)	0 (0.00)
Midden	Test Unit 6-North	0.13	70 (538.46)	12 (92.31)
Midden	Test Unit 1-North	0.15	39 (260.00)	6 (40.00)
Midden	Test Unit 1-South	0.41	35 (85.37)	13 (31.71)
Midden Total	n/a	0.89	146 (164.04)	31 (34.83)
Site Total	n/a	8.69	761 (87.61)	236 (27.17)

depositional contexts. The excavation units within each of the depositional contexts at Pueblo de la Mesa were assigned unique sequential numbers. A random number generator was then used to select the units within each context included in the sample. All of the chipped stone artifacts from each selected unit were included in the sample. Since the analytical methods utilized in this study were labor intensive, the size of the Pueblo de la Mesa chipped stone sample (N=997) was constricted to roughly that of Frank's Ruin (N= 847). As a result, the Pueblo de la Mesa sample had an equitable representation of the depositional contexts and similar quantities of artifacts, permitting comparisons between the sites and contexts.

Table 4.2: Frank's Ruin Excavation Units				
Context	Coordinates	Volume	Debitage Frequency (Density)	Tool and Core Frequency (Density)
Room	517E 492N	2.8	24 (8.57)	7 (2.50)
Room	517E 495N	0.77	26 (33.77)	6 (7.79)
Room	518E 494N	0.92	34 (36.96)	5 (5.43)
Room	519E 496N	0.38	11 (28.95)	5 (13.16)
Room	516E 496N	0.05	1 (20.00)	3 (60.00)
Room	498E 514N	1.8	10 (5.56)	0 (0.00)

Table 4.2 (co
Room
Room
Room
Midden
Midden
Room
Room
Room
Room
Room
Room
Room Total
Plaza
Plaza
Plaza
Plaza
Plaza Entry
Plaza Entry
Plaza Entry
Plaza Entry
Plaza Entry
Plaza Entry
Plaza Entry
Plaza Total
Midden
Midden
Midden
Midden
Midden
Midden Total
Site Total

All of the
for the comparison
deposits within
of the temporal
assemblage to
fine-grained and
assessing the
and discard it
as temporally

Table 4.2 (cont'd)				
Room	498E 514N	0.66	1 (1.52)	2 (3.03)
Room	499E 514N	1.54	10 (6.49)	1 (0.65)
Room	500E 515N	1.37	0 (0.00)	0 (0.00)
Midden	484E 495N	1.12	10 (8.93)	1 (0.89)
Midden	484E 493N	0.08	7 (87.50)	0 (0.00)
Room	492E 489N	1.86	42 (22.58)	16 (8.60)
Room	493E 492N	1.6	28 (17.50)	9 (5.63)
Room	494E 492N	1.46	25 (17.12)	10 (6.85)
Room	498E 503N	0.15	3 (20.00)	4 (26.67)
Room	503E 515N	0.6	1 (1.67)	0 (0.00)
Room Total	n/a	17.16	233 (13.57)	69 (4.02)
Plaza	486E 511N	0.87	0 (0.00)	0 (0.00)
Plaza	489E 511N	1.26	8 (6.35)	3 (2.38)
Plaza	490E 511N	0.53	2 (3.77)	0 (0.00)
Plaza	491E 511N	0.35	9 (25.71)	0 (0.00)
Plaza/Entry	506E 486N	0.89	63 (70.79)	15 (16.85)
Plaza/Entry	508E 486N	0.93	44 (47.31)	7 (7.53)
Plaza/Entry	506E 487N	0.51	9 (17.65)	1 (1.96)
Plaza/Entry	505E 485N	0.625	0 (0.00)	0 (0.00)
Plaza/Entry	505E 484N	0.3	2 (6.67)	0 (0.00)
Plaza/Entry	505E 483N	0.6	7 (11.67)	3 (5.00)
Plaza Total	n/a	6.865	144 (20.98)	29 (4.22)
Midden	510E 522N	0.46	22 (47.83)	1 (2.17)
Midden	525E 513N	0.83	121 (145.78)	11 (13.25)
Midden	524E 513N	0.59	95 (161.02)	9 (15.25)
Midden	524E 514N	0.43	76 (176.74)	11 (25.58)
Midden	476E 495N	0.22	25 (113.64)	1 (4.55)
Midden Total	n/a	2.53	339 (133.99)	33 (13.04)
Site Total	n/a	26.555	716 (26.96)	131 (4.93)

All of the artifacts from within each of the sampled units were grouped together for the comparisons made in this research. The overall lack of definitive dating of deposits within and among excavated units at the pueblos precluded a fine-grain analysis of the temporal patterns at the sites (e.g. comparing the early occupation Frank's Ruin assemblage to the early occupation Pueblo de la Mesa assemblage). A more temporally fine-grained analysis would certainly be interesting, but since the focus of this research is assessing the similarities or differences in broad patterns of stone tool manufacture, use, and discard it proved to be beyond the scope of this thesis. Treating the excavated units as temporally "flat" does not precisely reflect the behavioral reality of the occupations at

both sites. In

(roughly 40

of behavioral

In ge

spatial units

rooms would

midden areas

from each of

locations of c

occupation of

been similarit

activities carr

that each of th

Indeed, it is no

middens or for

(Adams 1983;

conclusions ba

assemblages an

rooted in room

to the compari

aggregate com

room assembl

abandonment

both sites. However, since the pueblos were not occupied for extensive periods of time (roughly 4 or 5 generations) a temporally flat analysis likely represents an approximation of behavioral reality.

In general we can assume that the three depositional contexts represent separate spatial units that were recognized by the inhabitants of the pueblos. In other words, rooms would have been treated differently than the plaza (see Rautman 2000) and midden areas of the pueblos, which in turn would have been treated as unique spaces from each other and the rooms. Thus, these discrete spatial units were likely the locations of different suites of activities and depositional behaviors throughout the occupation of the pueblos (Schiffer 1985). That is not to say that there could not have been similarities in the type, intensity, and duration of the social and/or economic activities carried out in the different contexts. Nor is it necessarily accurate to assume that each of the depositional contexts was used in a uniform manner through time. Indeed, it is not uncommon at Southwestern sites for rooms to be abandoned and used as middens or for rooms to have unique functions (e.g. habitation, storage, or ceremonial) (Adams 1983; Cameron 1999). Due to the mutability of room function through time, conclusions based solely on similarities or differences in the composition of room assemblages are suspect. In this research the crux of the interpretative arguments are not rooted in room assemblage similarities or differences. Rather, more meaning is assigned to the comparisons of the more functionally stable plaza and midden contexts, as well as aggregate comparisons of site-wide assemblages. As will be discussed in Chapter 9, room assemblage compositions are also likely sensitive to the affects of divergent abandonment processes, which further bolsters the logic for their interpretive marginality.

There has been a great deal of research in Southwestern archaeology associated with identifying room function based on room size (Adams 1983; Cameron 1999) and artifact composition (Ciolek-Torrello 1985). Much of this research relies on analogies deriving from historical and ethnographic accounts, which are complicated by the dramatic temporal changes in the use of space within pueblos between the prehistoric and historic periods (James 1997). Archaeological interpretations of distinct room functions are invariably applied at pueblo sites in which the majority of the rooms have been excavated (see Adams 1983; Cameron 1999; Ciolek-Torrello 1985), with the artifact and feature content of the rooms recorded, as well as the spatial relationship among rooms delineated. This level of archaeological resolution was not available at Frank's Ruin or Pueblo de la Mesa since only a fraction of the total rooms at both sites were tested. The grouping of all of the artifacts from each of the contexts at the sites reflects the level of resolution available for the datasets. Hopefully further excavations will yield data that allows for a more nuanced understanding of room function and the utilization of the plaza and midden areas at the sites.

In sum, there are numerous ethnographic and archaeological works that support the generally discrete use of space in historic and prehistoric pueblos, and there is little reason to assume that this was different at Frank's Ruin and Pueblo de la Mesa. Analytically it is useful to group cases (i.e. artifacts within excavation units) by depositional context for the computation and presentation of data. Additionally, grouping excavation units by depositional context permits for more general statements to be made about the data, rather than solely idiosyncratic statements about the chipped stone artifacts found in specific excavation units.

Lithic Raw Material Types in the Salinas Region

A number of researchers have demonstrated the influence of lithic raw material quality and abundance on the organization of lithic technology (Andrefsky 1994; Bamforth 1986; Kelly 1988; Nelson 1991). In order to identify patterns in the chipped stone data that are sensitive to variation in raw material type, the analysis conducted in this research will differentiate among the common tool stones used in the study area. Compared to other regions (e.g. Great Lakes, Great Basin, Canadian Plateau, etc.) there has not been a great deal of archaeologically relevant work in the study area linking identifiable raw material types with their source locations (Rautman 1990:291; Spielmann 1988). This is largely due to the lack of archaeological research in the Salinas region, especially the paucity of studies focusing on chipped stone tools. In this research, the raw material types were differentiated based on the geologic mineral or rock variety (e.g. chert, chalcedony, limestone, obsidian, quartzite, etc.), color (e.g. white, orange, gray, etc.), and in some cases texture (e.g. fine grain, coarse grain, etc.) and opacity (e.g. opaque or clear). It is recognized that because of the natural variation in color, texture, and opacity within a single raw material source, distinguishing raw material types based on these attributes is not overly precise. In order to maintain a realistic level of precision, similar raw material types have been grouped under a single raw material category. Below, these raw material categories are defined and their geologic distributions within and outside of the Salinas region are described. Table 4.3 provides a summary of this information.

Table 4.3: Raw Material Categories		
Raw Material Category (Distance from Sites)	Mineral or Rock Variety	Color(s)
Local Limestone (<2 km)	Limestone	Gray, Black or Dark Gray
Local Quartzite (<2 km)	Quartzite	White, Gray, Black/Dark Gray, Brown/Caramel, Purple, Reddish, Yellow/Amber, Pink, Peach, Maroon, Orange, Beige/Tan,
Local Chert (<2 km)	Chert	Gray, Black/Dark Gray, Brown/Caramel, Purple, Reddish, Orange, Yellow/Amber, Greenish/Yellow-Green, Pink, Beige/Tan, Peach, Dark/Brown, Red/Orange, Maroon, Red/Tan Mottled, Burnt (cannot identify color)
Local Chalcedony (<2 km)	Chalcedony	Clear, White, Gray, Black/Dark Gray, Reddish, Peach
Near-Local Mountainair Chert (<40 km)	Mountainair Chert	White, Heat-Treated Mountainair (White/Glassy)
Non-Local Igneous (>40 km)	Felsic (Igneous)	Brown/Caramel, Reddish, Maroon
Non-Local Igneous (>40 km)	Mafic (Igneous)	Gray, Black/Dark Gray, Brown/Caramel, Reddish, Maroon, Black/Orange Mottled
Non-Local Obsidian (>40 km)	Obsidian	Opaque Black, Clear Black
Other (Unknown)	Mica, Quartz Crystal, Siltstone	White, Clear, Gray

Local Limestone

At both pueblos, limestone and sandstone were the principal stone types used for the masonry architectural elements (Rautman 1995, 2008). The dark to light gray, relatively hard, relatively fine-grained limestone found at the sites was also used for chipped stone tool manufacture. Compared to the other raw material categories, local limestone has the lowest quality with regards to its hardness and predictable fracturing. Nonetheless, at other prehistoric and protohistoric pueblos in the study area (e.g. Kite Pueblo and Gran Quivira) it is not uncommon to find limestone chipped stone tools and debitage (Rautman 1990:294; Young 1981). Limestone outcrops are located within the immediate vicinity of Pueblo de la Mesa and Frank's Ruin (<2 km), as well as at numerous locations on Chupadera Mesa (Rautman 1990, 1995, 2008). Limestone can

also be found in secondary deposits throughout the low lying areas of the Salinas Valley and the Medanos Plains (Rautman 1990:294). At the limestone outcrops near both of the sites large nodules (>20 kg) are common, making this raw material category the most abundant and ubiquitous with regards to potential availability (Rautman 1995, 2008). The typical “package size” (i.e. nodule size) is also by far the largest of all of the raw material categories. Only limestone artifacts that were clearly chipped stone tools or debitage were incorporated in the study, avoiding the inclusion of flake-like pieces produced by natural processes (e.g. chemical weathering or spalling due to intense heat or freeze/thaw cycles).

Local Quartzite

Several varieties of quartzite, ranging from fine- to coarse-grained, are common to the pediment gravels in the vicinity (<2 km) of both sites (Rautman 1990). The source locations for these varieties are unknown but the occurrence of unworked cobbles within the cultural and natural deposits at the sites and in the gravels of the outlying areas suggests that the source(s) are local (Rautman 1990). The typical package size of the local quartzite nodules near Frank’s Ruin is much smaller than limestone, with globular cobbles ranging from roughly 0.5 kg to 2 kg. The package size of the local quartzite near Pueblo de la Mesa is within a similar range (Rautman 2008 personal communication).

Local Chert

Opaque, fine- to medium-grained cryptocrystalline cherts are also common to the pediment gravels in the immediate area (<2 km) of both sites. Like the local quartzite, unworked cobbles of these chert varieties were identified in the cultural and non-cultural deposits around Frank’s Ruin (Foss 2007 personnel observation) and at Pueblo de la

Mesa (Ra

size of lo

L

S

are comm

of the sit

that the

local cha

0.5 kg to

of chert

(Rautm

along S

within

material

packag

and loc

7

debitage

sources (

vicinity o

Mesa (Rautman 1995), suggesting a local source(s) for these stones. The typical package size of local chert is roughly similar to that of the local quartzite.

Local Chalcedony

Semi-translucent, fine-grained chalcedonies, like local quartzite and local chert, are common to the pediment gravels and other gravel deposits found at, and around both of the sites (<2 km) (Rautman 1990, 1995). Based on this local occurrence, it is likely that the source(s) for local chalcedony is near the sites. The typical package size for the local chalcedony is smaller than that of the local quartzite and local chert, ranging from 0.5 kg to 1 kg.

Near-Local Mountainair Chert

The fine-grained, opaque, distinctively white Mountainair Chert is the one variety of chert found at both sites that has identified outcroppings within the Salinas region (Rautman 1990:298). A number of outcroppings of Mountainair Chert are known to exist along State Highway 55 between the modern towns Gran Quivira and Mountainair, within roughly 40 km of both sites (Rautman 1990). Based on examples of this raw material type at the Salinas Pueblo Missions National Monument visitor center the typical package size of Mountainair Chert at these outcroppings is roughly that of local quartzite and local chert.

Non-Local Igneous

The geology of the study area suggests that the mafic and felsic igneous tools and debitage found at the sites derive from unambiguously non-local (>40 km) raw material sources (Rautman 1990:300). Rautman (1990) identified a Tertiary-age intrusion in the vicinity of Frank's Ruin during a geological reconnaissance, but determined that the

qualities of the stone were not conducive to controlled reduction. The typical package size of the non-local igneous category is unknown.

Non-Local Obsidian

The primary obsidian sources utilized during the late prehistoric period in the Salinas region derive from outcrops in the Jemez Mountains in north central New Mexico and from outcrops around Mt. Taylor in west central New Mexico, both of which are over 150 km distant from the sites (Graves 2005:13). Secondary deposits of obsidian can also infrequently be found in the alluvial gravels along the Rio Grande below these sources (Graves 2005). This secondary source is over 40 km distant from both sites. The typical package size of obsidian at the primary obsidian sources has been described as “fist-sized or greater”; the secondary deposits of “Apache tears” are often less than 3 cm in length (Graves 2005:21).

“Other” Raw Material Types

A handful of other lithic raw material types were rarely used for chipped stone technology at the sites, constituting a trivial amount (less than 0.5%) of either assemblage. The stone types included in the “other” raw material category are siltstone, quartz crystal, and mica. The source location and the typical package size are not known for these raw material types.

Summary

In this chapter the sampling methodology utilized at both sites was discussed as were the two analytical dimensions used in the chipped stone artifact analysis. These topics are crucial to the research design of this thesis since sampling methodology largely determines the appropriateness of assemblage comparisons and the analytical dimensions

form th

framew

and intr

form the units of analysis. In the next chapter the theoretical and methodological framework of the lithic analyses are explained, followed by the results of the inter-site and intra-site assemblage comparisons in Chapters 6, 7, 8, and 9.

Chapter 5: Analytical Framework

Introduction

The goal of this chapter is to present the analytical framework for the comparison of the Frank's Ruin and Pueblo de la Mesa chipped stone assemblages. The theoretical foundation for the research is considered first, in order to lay the logical foundation in which this research is rooted. Next, the analytical scope of the research is defined, followed by a discussion of the variables recorded and laboratory methodology used to study the stone tools and debitage. Embedded in these discussions are the predictions for the stone tool and debitage analyses along with an explanation of the theoretical implications of these predictions.

Theoretical Foundation: Organization of Lithic Technology

There are a number of cultural factors (e.g. economic, social, ideological, political) and environmental factors (e.g. resource type, resource seasonality, lithic raw material distribution) that influence how humans procured, used, and discarded stone tools (Nelson 1991:57). Rather than focus on how stone tools were used to accomplish specific activities or how stone tool morphology reflects discrete social identities, studies that looked towards the organization of technology aim to understand how stone tool strategies were implemented to address these cultural and environmental factors within a cultural system (Andrefsky 2008:4). The advantage of an organization of technology approach towards lithic analysis is that it allows for the entire stone tool assemblage, as well as the entire stone tool procurement, use, and discard process to inform on broader cultural questions emphasizing human adaptations (Nelson 1991).

Since studies that emphasize the organization of technology seek to make broad statements about stone tool strategies within a cultural system, many organization of technology approaches to stone tool analysis make necessarily broad categorical distinctions. One of these distinctions, first articulated by Lewis Binford in the 1970s (Binford 1979), is the distinction between expedient and curated tool strategies (Bamforth 1986). This thesis relies heavily on distinguishing between archaeological evidence for curated tool strategies and the evidence for expedient tool strategies, so the definitions of what constitutes each is dealt with in detail. Before the discussion begins, however, it is necessary to emphasize that the curated/expedient distinction is not a binary proposition; rather tools and assemblages of tools exist on a continuum from more curated to less curated (Nelson 1991).

Curated and Expedient Tools

There is a vigorous debate among archaeologists concerning exactly what qualities constitute a curated tool strategy but the following characteristics are generally held in common. In a curated strategy tools are: 1) manufactured in anticipation of use, 2) typically effective for a variety of tasks, 3) maintained after use, 4) transported between uses, and 5) can be modified to accomplish different tasks (Bamforth 1986:38). Shott (1996:267) makes the important point that curation cannot be judged by any one of the above criterion, rather the degree of tool curation is best judged through assessing the relationship between these criteria. Shott (1996) and Andrefsky (2008:8) both argue that the degree of curation is best thought of as an expression of a tool's actual use in relation to its maximum potential use. The artifact attributes that indicate that a tool was manufactured in anticipation of a task, functionally flexible, maintainable, transportable,

and modifiable all relate to maximizing a tool's use, allowing for "curated tools" to be identified in the archaeological record without witnessing the specific use-life of each tool. The epitome of a curated tool is a biface, which can be used to accomplish a number of tasks (e.g. cutting, scraping, perforating, projectile point, flake core, etc), is easily maintained, highly portable, and can be reshaped to fit newly anticipated needs (Kelly 1988; Parry and Kelly 1987:288).

At the other end of the continuum are expedient strategies in which tools are: 1) manufactured for an immediate need, 2) not shaped for a specific task, and 3) discarded after minimal use (Bamforth 1986:38; Parry and Kelly 1987: 288). A prime example of an expedient tool would be a flake removed from an unstandardized core, used with little or no modification, and discarded once the task at hand was completed (Parry and Kelly 1987:288). It is worth reiterating that an expedient tool is not the inverse of a curated tool; instead, expedient tools are tools that are minimally curated (Shott 1996: 267).

It is important to note that tools, as well as tool assemblages can be compared along the expedient/curated continuum, allowing for the distinction to be useful on a number of levels ranging from comparisons of isolated artifacts, to comparisons of aggregate assemblages from entire time periods (e.g. comparing Southwestern Archaic to Basketmaker III) (*Cf.* Parry and Kelly 1987). These levels of comparison can all inform on the prevailing mode of stone tool strategy, and together they allow for an assessment of the system-wide use of stone tools. It is worth emphasizing that there are many components to the organization of the lithic technology. The distinction between curated and expedient strategies is one of these components, but by no means is it the only organizing principle.

Examples of the Curated/Expedient Distinction Implemented in Research

Small-scale, foraging societies have been the subject of much of the lithic analysis conducted in North America by North American archaeologists, and as a result the types of cultural and environmental factors that are used to explain variation in lithic assemblages are geared towards this subject matter (Andrefsky 2008:4). Forager land use practices, especially relating to the interplay between mobility strategy (e.g. residential or logistical) and lithic raw material abundance (ranging from ubiquitous to scarce), are often cited as fundamental organizational determinants of lithic technology with regards to curated and expedient technologies. Not limited to only foraging societies, some archaeologists have drawn from the organization of technology approach to make important insights into middle-range, semi-sedentary to sedentary societies using the curated and expedient distinction to help identify socioeconomic factors that explain variability in the archaeological record. A selection of these works is reviewed below to provide a sampling of the breadth and depth of research that has fruitfully drawn from this distinction (Andrefsky 1994; Bamforth 1986; Jeske 1992; Parry and Kelly 1987).

In a cross cultural study, Parry and Kelly (1987) found that as residential mobility decreased through time, the ratio between expedient tools and curated tools rose. In every one of culture areas surveyed (American Southwest, Mesoamerica, the Great Plains, and the Eastern Woodlands) there was a general reduction of bifaces, which were used as proxy measures for a curated strategy, compared to unstandardized cores, which were used as proxy measures for an expedient strategy. The authors contend that during the earlier periods of high residential mobility the anticipated functions of tools and the availability of raw material was less predictable (Parry and Kelly 1987). As a

consequence of these conditions a more curated strategy was employed, allowing for the highly adaptable tools to be used for multiple tasks with the reuse of tools conserving unpredictable raw material supplies. During the later periods of semi-sedentary to sedentary settlement strategies, Parry and Kelly assert that there was less of a need to manufacture the “costly” (in time, effort, and expertise) curated tools since future stone tool needs could be accurately predicted and even scheduled, and the availability of raw material would be known and possibly controllable through caching and exchange (Parry and Kelly 1987: 300).

Bamforth (1986) also conducted a cross cultural survey, drawing from archaeological and ethnographic data, and found that raw material availability plays an important role in whether or not a more curated or more expedient tool strategy is employed. Using data from California, the Great Plains, and the Kalahari, Bamforth substantiated that during periods of raw material scarcity, because of geologic and/or cultural factors (i.e. restricted direct procurement/exchange access), curated tool strategies were more likely to have been utilized even when different mobility strategies were in place. Bamforth contends that a more curated tool strategy allowed for more efficient use of raw material through tool maintenance and “recycling” of tools into new forms to accomplish different tasks.

Using ethnographic data from Australia and archaeological data from the Columbian Plateau and the Great Plains, Andrefsky (1994) documented the relationship between the availability of raw material and whether a curated or expedient tool strategy was practiced. Andrefsky added the nuance of raw material quality (i.e. predictable and controllable fracture) to the assessment of technological responses to raw material

scarcity. In each of the case studies Andrefsky found that when high quality raw materials were scarce they were primarily used to make “formal tools”, which Andrefsky used as proxy measures for curated tools. Andrefsky also found that low quality raw materials generally were used to make expedient, “informal tools.” In cases where high quality raw materials were abundant, they were used to make both curated and expedient tools. This research indicates that not only does raw material abundance and quality affect the overall technological strategy; it also affects intra-assemblage raw material choices.

Jeske (1992) interprets the Upper Mississippian’s Late Prehistoric dependence on poor quality raw materials and expedient tool manufacture techniques (i.e. bipolar reduction) as indicative of a general decline in the amount of energy expended on stone tool technology. During the earlier Middle Woodland time period there was “considerable energy [put] into the procurement of raw materials and the production of stone tools”, which was manifest in the finely made bifaces and other formal tools from that era (Jeske 1992:477). Jeske contends that this reduction in energy applied to stone tool manufacture stems from the increased demands for social and political activities, such as territorial defense, trade partnerships, and political alliances (Jeske 1992: 469). In order to strike an energetic balance, Jeske proposed that the Upper Mississippians expended less effort procuring high quality lithic raw materials and less time in manufacturing lithic artifacts, resulting in the general “degeneration” of the lithic technology through time (Jeske 1992:469).

This brief review indicates ways in which the curated/expedient strategy distinction has been used to profitably make statements about the organization of

technology and more broadly on human adaptation. It is apparent that not all of the authors agree on the conditions that predict which tool strategy will be employed. In fact the conclusions put forth by Andrefsky (1994) and Bamforth (1986) seem to be at odds with the conclusions reached by Parry and Kelly (1987), at least in terms of which factor they view as primary. Meanwhile, Jeske (1992) explains the transition to a more expedient technology for the Upper Mississippians by emphasizing the importance of a shifting energetic balance brought on by social and political changes. Despite the differences between these studies they agree on two points; 1) the technological choice to engage in a more expedient or a more curated tool strategy can be effectively measured in the archaeological record, and 2) differences in the respective proportions of curated and expedient tools may reflect important large-scale behavioral differences between societies or within the same society through time.

Relevance to this Research

This study applies comparisons between the relative proportions of curated and expedient tools from Frank's Ruin and Pueblo de la Mesa to assess the overall similarity in the organization of technology utilized by the inhabitants of the pueblos. The predictions of the analysis will be dealt with in detail later in this chapter, but in general there should be no major differences in the organization of technology between the sites since most of the factors that could logically condition the procurement, use, and discard of stone tools are essentially identical (see Chapter 3). One substantive incongruity between the sites is in their length of occupation, which could affect overall artifact density but not necessarily the proportional composition of the assemblages. The other dissimilarity is the divergent depositional histories of the room contexts between the

sites, which could affect both the density and proportional composition of the room assemblages.

Caveats to Organization of Technology Studies

Comparing the lithic assemblages from only two sites has its drawbacks when making statements about the overall similarity in the organization of technology. In order to fully evaluate an entire technological strategy one would ideally have data from all of the sites, or at least a representative sample of all the site types, within a given cultural system. This is particularly true in situations when, within a single cultural system, there was substantial variation in the duration of site occupation and fundamental differences in the range, type, and intensity of tasks conducted at the various site types (e.g. pueblos, field houses, logistical campsites, kill/butchering sites, ceremonial sites, quarries, etc.). The lack of comprehensive site type inclusion in this study does limit the type of conclusions that can be drawn from the data; it limits the ability to directly identify a relationship between a difference in lithic tool organizational strategies and the cultural or natural factors related to site type that structured this difference.

Despite these limitations, a strong case can still be made for the utility of comparing the assemblages from two pueblo sites. Using a single functional site type in the analysis ensures that the tasks that stone tools would have been used for were roughly similar in functional range and intensity. Furthermore, of all of the possible site types in the study area, pueblos would have been occupied the longest and the activities involving stone tools likely would have been the most intense, as well as the most diverse. These qualities are especially important in light of the staged reduction of stone tools. If many of the activities that stone tools were used for were located at the same place (i.e. a

pueblo) then there is a higher likelihood that the assemblage would represent much of the reduction sequence (e.g. from core to blank to finished tool to resharpened tool to discarded tool); (Teltser 1991:372). That is not to say that tools could not have been manufactured off site and deposited within the pueblo, or vice versa. Rather, the point being made is that the range of variability within a technological system is better represented in a pueblo than at other site types. The same cannot be said of the lithic assemblages from many of the sites made by more residentially and logistically mobile peoples, where it is well documented that the stages of reduction for many stone tool types were carried out at different locations across the landscape, resulting in an incomplete reduction sequence representation at any one site (Teltser 1991).

In sum, since the lithic assemblage from a pueblo provides a reasonably representative subset of the larger (i.e. system-wide) organization of lithic technology, a comparison of two pueblo assemblages should reveal the sites' similarities or differences in the organization of technology. In turn, similarities or differences in the organization of lithic technology suggest that there may also be larger socioeconomic similarities or differences structuring behaviors.

Analytical and Laboratory Methods

In this section the analytical scope (i.e. the "data universe") of this study is explicated. Specific definitions for the analytical variables are defined and discussed, as are the laboratory methods used to collect the relevant information for these variables. The goal is to provide clear explanations for what is being studied, how it was analyzed, what the implications of possible findings are, and finally, how does it all relate to the research question at hand.

The artifacts of interest in this study are chipped stone tools and debitage. Only stone artifacts that are the product of reduction, that is the physical removal of “chips” through direct percussion, indirect percussion, pressure flaking, and bipolar reduction are included. Ground, abraded, pecked, and incised stone tools are not examined, precluding analysis of artifacts types such as manos, metates, hammerstones, mauls, rubbing stones, and hoes.

Chipped Stone Tools

Andrefsky (2005) defines a stone tool as an artifact that has been “intentionally modified by retouch or unintentionally modified by usewear.” Retouch refers to the deliberate shaping or resharpening of a tool’s edge through the removal of flakes. Thus, retouch can occur during the production-phase of a stone tool’s use-life when it is initially shaped into a usable form, as well as after the initial form has been achieved during the resharpening and/or modification-phase of the tool’s use-life. Usewear refers to the unintentional modification of an implement through spontaneous flake removal, grinding, and/or polishing occurring during the use of the tool. The definition of stone tools used here relies heavily on the morphology of the artifact to determine if it is to be considered a stone tool, since we cannot directly observe whether or not an implement was utilized to accomplish a task. This relatively comprehensive definition of stone tools allows for the inclusion of artifacts that may not have been actually “used”, but were in the process of production (e.g. biface “blanks”).

Stone Tool Laboratory Analysis

The laboratory protocol used to record the stone tool data was developed in the context of compiling a descriptive analysis of the 2007 excavations at Frank’s Ruin. In

order to provide a full description of the dataset, a wide range of variables were recorded. Many of the variables recorded are “holdovers” from previous lithic analyses conducted in the study area by Dr. Alison Rautman (Rautman 1990, 1992, 1993b, 1995), while others are new variables added to further enhance the research possibilities of the data (see Table 5.1). The same array of variables were recorded by the same individual (i.e. the author) for the Pueblo de la Mesa sample using identical analysis techniques, allowing for direct comparability between the Frank’s Ruin and Pueblo de la Mesa datasets. Although all of the variables are analytically useful, most were not applicable or necessary to answer the specific research question that is the aim of this thesis. The reader is directed to Appendices B and C³ for definitions and descriptions of the all of the tool variables recorded and Appendices E, F, H, and I for the tabulated data from both sites. It is lamentable that much of the lab work will not be applied to this analysis, but I hope that subsequent research will use the data to profitably address research questions.

Table 5.1: Variables Recorded for Stone Tools		
Variable	Data Type	Applicable Tool Type
Raw Material	Nominal	All Tools
Tool Type	Nominal	All Tools
Condition	Ordinal	All Tools
Flake Type (Old)	Nominal	Informal Tools Only
Dorsal Cortex Cover	Ordinal	All Tools
Platform Flake Scars	Ratio	Informal Tools Only
Dorsal Flake Scars	Ratio	Informal Tools Only
Initiation Type	Nominal	Informal Tools Only
Termination Type	Nominal	Informal Tools Only
Flake Type (New)	Nominal	Informal Tools Only
Length	Ratio	All Tools
Width	Ratio	All Tools
Thickness	Ratio	All Tools
Weight	Ratio	All Tools
Extent of Margin Retouch/Usewear*	Ratio	Non-Projectile Point Tools
Type of Margin Retouch/Usewear*	Nominal	Non-Projectile Point Tools
Invasiveness of Retouch/Usewear*	Ratio	Non-Projectile Point Tools

³ Appendix B is a list of variables recorded for stone tools. Appendix C is a list of variables recorded for projectile points. All of the same stone tool variables were recorded for the projectile points, along with a number of additional variables. In this research projectile points are included in the stone tool analysis.

Table 5.1 (cont'd)		
Extent of Trampling Damage*	Ratio	Non-Projectile Point Tools
Extent of Grinding*	Ratio	Non-Projectile Point Tools
Average Edge Angle*	Ratio	Non-Projectile Point Tools
Margin Shape*	Nominal	Non-Projectile Point Tools
Tool Shape (Plan view)	Nominal	Non-Projectile Point Tools
Tool Shape (Transverse View)	Nominal	Non-Projectile Point Tools
Tool Shape (Longitudinal View)	Nominal	Non-Projectile Point Tools
Base Width	Ratio	Projectile Points Only
Base Thickness	Ratio	Projectile Points Only
Base Shape	Nominal	Projectile Points Only
Haft Length	Ratio	Projectile Points Only
Haft Width (Distal)	Ratio	Projectile Points Only
Haft Width (Proximal)	Ratio	Projectile Points Only
Haft Thickness	Ratio	Projectile Points Only
Haft Base Shape	Nominal	Projectile Points Only
Extent of Haft Grinding	Ratio	Projectile Points Only
Shoulder Width	Ratio	Projectile Points Only
Shoulder Thickness	Ratio	Projectile Points Only
Shoulder Shape	Nominal	Projectile Points Only
Blade Length	Ratio	Projectile Points Only
Maximum Blade Width	Ratio	Projectile Points Only
Maximum Blade Thickness	Ratio	Projectile Points Only
Blade Shape	Nominal	Projectile Points Only
Extent of Retouch **	Ratio	Projectile Points Only
Type of Usewear/Retouch**	Nominal	Projectile Points Only
Invasiveness of Usewear/Retouch**	Ratio	Projectile Points Only
Extent of Grinding**	Ratio	Projectile Points Only
Extent of Trampling Damage**	Ratio	Projectile Points Only
Average Edge Angle**	Ratio	Projectile Points Only
Margin Blade Shape**	Nominal	Projectile Points Only
Depth of Notch**	Ratio	Projectile Points Only
Depth of Basal Notch	Ratio	Projectile Points Only
Projectile Point Shape (Plan View)	Nominal	Projectile Points Only
Projectile Point Shape (Transverse View)	Nominal	Projectile Points Only
Projectile Point Shape (Longitudinal View)	Nominal	Projectile Points Only
Degree of Symmetry	Ordinal	Projectile Points Only
Blade Flaking Pattern	Nominal	Projectile Points Only
* These variables were measured for each margin (left, right, distal, and proximal)		
** These variables were measured for each margin (left and right)		

The principal variables used in this stone tool analysis are artifact type, condition, and raw material type. Condition will be discussed later in this chapter and raw material type was discussed in Chapter 4. The artifact type variable was determined by; 1) tool morphology, 2) the location and extent of retouch, and 3) reduction technology (Odell 2004:89). Stone tools were assigned a type based on the characteristics of these three

criterion using clearly defined, widely recognized tool type definitions. Table 5.2 lists the tool types found in the assemblages. The reader is directed to Appendix B for formal definitions of each type. The benefit of applying a typological analysis to stone tools is that a range of complex information about a tool's form and characteristics can be subsumed under a single term.

Table 5.2: List of Tool Types and Curation Level	
Tool Type	Curation Level
Utilized Flake (one margin)	CL1
Utilized Flake (two non-convergent margins)	CL1
Utilized Block/Shatter	CL1
Retouched Block/Shatter	CL1
Unifacial Retouched Pebble	CL1
Retouched Flake (one margin)	CL1
Utilized Flake (two convergent margins)	CL2
Utilized Flake (more than two margins)	CL2
Retouched Flake (more than one margin)	CL2
Notch	CL3
Denticulate	CL3
Piercer	CL3
Burin	CL3
Pieces Esquillee	CL3
Side Scraper	CL3
End Scraper	CL3
Drill	CL3
Biface (Stage 1)	CL3
Biface (Stage 2)	CL3
Biface (Stage 3)	CL3
Biface (Stage 4)	CL4
Bifacial Knife	CL4
Projectile Point	CL4

Curated and Expedient Tools

It is comparatively easy to establish if an artifact is a tool, but determining if a tool should be considered curated or expedient is a more complicated endeavor.

Andrefsky (1994) provides a useful starting point by dividing tools into categories of

“formal” and “informal” based on the degree of effort expended during and after manufacture. Formal tools consist of artifacts that exhibit features indicating a high degree of effort was expended during the tool’s production and use-life. Evidence for these qualities includes; a high degree of initial artifact shaping (through core preparation and/or purposeful reduction), multiple tool elements (e.g. haft, multiple working edges), highly refined working edges (e.g. working edges that are broad and consistent), and resharpening. Not all of these qualities are necessary or sufficient for a tool to be considered formal; instead the frequency and degree of these qualities are factored together. It is worth noting that most of these qualities have direct corollaries in the more abstract, organization of the technology-based definition for curated tools; initial tool shape is related to anticipated use, multiple working edges relates to functional flexibility, and resharpening relates to maintenance and modifiability.

At the other end of the curation continuum are expedient tools (i.e. “informal tools”) which exhibit little or no effort in manufacture and were likely used and discarded during a short span of time (Andrefsky 1994:22). Evidence for this lack of manufacturing effort and short use-life includes: minimal production retouch, minimal resharpening, little or no usewear, and simple tool forms with single working edges.

The qualities used in this study to determine the level of tool curation have multiple components that are largely qualitative. A number of recent studies have looked towards measuring the amount of retouch on a tool to provide a more quantitative method for measuring the level of tool curation. Clarkson (2002) and Andrefsky (2006) both proposed methods that measure the invasiveness of retouch on tool faces, indicting the amount of manufacturing effort, resharpening intensity, and possibly the degree of

functional flexibility. Kuhn (1990) measured the degree of production and resharpening retouch through evaluation of the geometric relationship between the maximum thickness of the tool, the vertical tool thickness at a retouch flake's termination, and the edge angle at the point of retouch. Eren and Prendergast's (2008) measurement was similar to Kuhn's (1990), except their method averages the values along the working edge and treats the tool in three dimensions instead of two by calculating the volume lost due to resharpening retouch.

These new avenues of research into quantifiable retouch indices are an interesting approach to the problem of identifying the level of the tool curation. Much of this research has been carried out using experimentally derived lithic tools to "test" the various indices. Because each index was tested on specific artifact types, Andrefsky (2006) on bifaces, Clarkson (2002) on unifaces and bifaces, and Kuhn (1990) and Eren and Prendergast (2008) on unifaces, it is not surprising that there is disagreement on which method is the best measure of retouch intensity. In light of the lack of agreement on which method would be best for multiple tool types and the time-intensiveness of the suggested methods it was decided that none of them would be appropriate for the large and diverse Frank's Ruin and Pueblo de la Mesa assemblages.

Instead, an ordinal qualitative approach is used to classify stone tools into four levels of curation, ranging from Curation Level 1 (CL1) through Curation Level 4 (CL4). The four-class ordinal system allows for a better representation of tool diversity than simply an expedient/curated classification. This classification is also a better fit to the concept of curation, which exists on a continuum. The morphological features that define the degree of curation are summarized in Table 5.3. Given that the definition of tool

curation is complex and multifaceted, the categorical determination is necessarily subjective. However, as the explanation of these categories below indicates, they are certainly not arbitrary.

Table 5.3: Morphological Features of Curation Levels	
Curation Level	Morphological Features
CL1	Minimal evidence of usewear and/or retouch Simple tool form with one or two working margins Lack of deliberate form
CL2	Light evidence of usewear and/or retouch Simple tool form with more than two working margins Lack of deliberate form
CL3	Moderate evidence of usewear and/or retouch Deliberately shaped working margin(s) May have a haft element Lacks standardized form
CL4	Heavy evidence of usewear and retouch More than one working margin Deliberately shaped working margins Has haft element Standardized form

Curation Level 1 tools have the least evidence of curation. These tools lack a deliberate form, have one or two working edges, and exhibit little evidence of retouch and usewear. Within the descriptive typology applied to the tool analysis (see Table 5.2) these tools include; utilized block/shatter, utilized flakes with one or two non-convergent margins with usewear, retouched block/shatter, unifacial retouched pebbles, and retouched flakes with a single margin of retouch (see Appendix B for full descriptions). These tools likely had short use-lives, being used and discarded shortly after manufacture without any manner of “recycling” or subsequent modification.

Curation Level 2 tools exhibit more curation than CL1 tools, but still lack a deliberate or standardized form. Within the descriptive typology (see Table 5.2) these tools include: utilized flakes with two convergent usewear margins, utilized flakes with

more than two usewear margins, and retouched flakes with more than one margin of retouch. These tools likely had longer use-lives, were utilized for more than one task, and were minimally modified to increase their utility.

Curation Level 3 tools have many, or all, of the characteristics of the CL2 tools, but have the added characteristic of a deliberately shaped working edge. Within the descriptive typology (see Table 5.2) these tools include; notches, denticulates, piercers, burins, pieces esquillees, side scrapers, end scrapers, and Stage 1 through Stage 3 bifaces. These tools were likely utilized over a long period of time, for either the same task repeatedly or multiple tasks through time and were retouched during their use-life to prolong their usefulness. The deliberate form of the working edge(s) suggests that these tools were manufactured in anticipation of use.

Curation Level 4 tools have all, or many, of the characteristics of the CL3 tools and were the most heavily curated tools in the assemblages. Beyond the qualities of the CL3 tools, the CL4 tools have evidence of multiple, well-formed working edges with heavy usewear and retouch. Some of the CL4 tools have distinct hafting elements that suggest they were deliberately shaped not only in anticipation of use but also for intense use. Within the descriptive typology (see Table 5.2) these tools include: bifacial knives, Stage 4 bifaces, and projectile points. These tools likely had the longest use-lives in the assemblages, with multiple episodes of use, resharpening, modification, and reuse.

Noticeably absent from this typology are cores. Cores are considered stone tools in this analysis because they were intentionally modified. However, cores have a completely different function compared to the other tool types in the assemblage. Rather than being used to accomplish a task, or set of tasks, cores are the objective pieces (*sensu*

Andrefsky 2005) from which flakes are detached. Despite this fundamental difference the curation concept can still be applied to cores, since the amount of platform and flake scar ridge preparation suggests the level of anticipated use for making deliberate flake forms. Heavily prepared cores (i.e. blade cores) are also quite efficient in producing a high usable-edge-to-flake-weight ratio, allowing for the maximum utility of the core to be achieved (Andrefsky 1994).

Table 5.4: List of Core Types and Curation Levels	
Core Type	Curation Level
Bipolar Core	CL1
Unidirectional Core	CL2
Multidirectional Core	CL2

In order to reflect the different levels of curation exhibited in cores they will be analyzed separately from the stone tools, with two categories of cores recognized: expedient cores and lightly curated cores. Expedient cores are those cores that exhibit no preparation of platforms or flake scar ridges, and were likely used as cores on an ad hoc basis to create flakes for expedient use. Within the core typology (Table 5.4), bipolar cores are classified as expedient cores. Lightly curated cores show some evidence of platform and flake scar ridge preparation. Within the core typology (Table 5.4), unidirectional and multidirectional cores are considered lightly curated. No blade cores were found in either of the assemblages. However, the existence of blade cores would have indicated a high level of core curation. This curation determination for cores does not presuppose that only minimally curated tools were made from the expedient and lightly curated cores. In fact, it would not be uncommon for highly curated tools to have their genesis from these more expedient core technologies. Instead, the core curation designation is used only to measure the degree of curation within the core artifact type.

Quantification Problem in Stone Tool Assemblages

Stone tools are frequently recovered in archaeological contexts as fragments, rather than as complete artifacts. Comparing the relative proportions of tool types is a common means through which archaeologists interpret past behaviors and is the principal analytical strategy applied to the tool assemblages in this research. It is, then, no trivial matter to determine how the recovered tools in different states of fragmentation are to be quantified. Shott (2000) identified this issue as the “quantification problem in stone tool assemblages.” Without resolving the quantification problem, a biface broken into five pieces could “count” as five bifaces, which poorly represents the actual biface frequency.

Table 5.5: Stone Tool Condition and Completeness Factor			
Condition Code	Condition (Formal Tools)	Condition (Informal Tools)	Completeness Factor
1	Complete	Intact	1
2	Base/haft	n/a	0.4
3	Base/haft and blade, tip missing	Proximal/Medial	0.8
4	Blade only	Medial	0.4
5	Blade and tip, base/haft missing	Medial/Distal	0.6
6	Tip	n/a	0.2
7	Broken longitudinally, may have part of all of the elements	Halving Break Shatter	0.5

In order to address this problem, condition is taken into account for each tool. Based on the condition of the tool, its frequency ($N=1$) is multiplied by a completeness factor to ensure that a complete tool is counted as “1” and a fragmentary tool is counted as a value less than one that roughly approximates the existing proportion of the tool fragment (see Table 5.5). For example, a bifacial knife fragment with only the base and haft intact will have a frequency of 0.40. A utilized flake fragment with only the proximal and medial flake elements intact will have a frequency of 0.80. When this method is

applied to tool assemblages the aggregate composition better reflects the actual relationships between tool type frequencies.

Stone Tool Assemblage Comparisons and Predictions

The similarity of the stone tool assemblages at Frank's Ruin and Pueblo de la Mesa will be evaluated through a comparison of the relative proportional importance of tool types (i.e. curation level types) among the depositional contexts (room, plaza, and midden) and between the aggregated site-level assemblages. Each of the raw material types will be analyzed separately in order to distinguish patterning related to the quality and proximity of lithic resources. The same type of analysis will be applied to the core data. The evaluation of relative proportional importance of tools by depositional context will not only allow for a comparison between the sites, it will also allow for an assessment of the organization of technology within the pueblos.

Based on the similarities between the two pueblos I predict that there will be no significant difference in the composition of the assemblages among the respective depositional contexts. This supposition excludes differences in overall artifact density due to dissimilarity of site occupation length, and differences in assemblage density and composition between room contexts due to divergent abandonment processes at the sites. This prediction presupposes that the organization of lithic technology at the sites was structured in a spatially similar manner, at least in the plaza and midden contexts. Embedded in this hypothesis is that the use of lithic raw materials at the sites was also similar. Since the depositional contexts were likely the locations of unique suites of activities and depositional processes when the pueblos were inhabited, I do expect to find

differences among these contexts within the same pueblo. However, the type and magnitude of these differences should be similar at both pueblos.

At a more general level I expect that the majority of stone tools at the sites will be lightly curated (i.e. CL1 and CL2). A number of authors have observed the general trend of more expedient tool assemblages in sedentary, agriculturalist societies (Jeske 1992; Parry and Kelly 1987). This pattern seems to also hold true for the late prehistoric sites in the Southwest (see Young and Harry 1989) and more specifically in the Salinas region (Rautman 1990, 1995; Spielmann 1988).

Chipped Stone Debitage

Chipped stone debitage are the unused, unretouched flakes that are the byproducts of core reduction, tool manufacture, and tool retouch. In general, the reduction process results in many more pieces of debitage than it does cores, formal tools, and informal tools (Odell 2004:118). The size, morphology, and attribute characteristics of individual pieces of debitage, as well as aggregate “populations” of debitage, are related to the reduction technique (e.g. hard hammer direct percussion, soft hammer direct percussion, pressure flaking, and bipolar) and the stage of reduction (early vs. late) from which the debitage originated. The goal of debitage analysis is to use these differences in form and attributes to make inferences about reduction processes. These inferences can then be linked to an organization of technology framework (i.e. tool manufacture, use, and discard) to provide information about higher level human adaptive strategies.

In this section, the principals of debitage analysis are discussed, as are the specific analytical methods employed in this research. The objectives of these discussions is to provide an overview of the strengths and weaknesses of debitage analysis, to provide an

interpretative framework for these analyses, and to explicate how these analyses relate to the stone tool analysis discussed above and more broadly to the research question that is the subject of this thesis.

Table 5.6: Debitage Variables	
Variable Name	Data Type
Raw Material	Nominal
Condition (Completeness)	Ordinal
Flake Type (Old)	Nominal
Flake Type (New)	Nominal
Dorsal Cortex Cover	Ordinal
Platform Scar Count	Ratio
Dorsal Scar Count	Ratio
Initiation	Nominal
Termination	Nominal
Size (Max. Linear Dimension)	Ordinal
Weight	Ratio

Table 5.6 lists the variables recorded for both sites'debitage. The context of thedebitage laboratory analysis was the same as the stone tool laboratory analysis (see above). It is worth reiterating that the methodologies were the same for both sites, as was the recorder of this information. Like the stone tool variables, some of thedebitage variables are holdovers from previous lithic studies in the Salinas region while others are new to this research. Appendix A provides definitions of each variable along with a discussion of laboratory methods. Appendices D and G contain the tabulated data from both sites.

Debitage Analysis and Replicative Experiments

Throughout much of the history of archaeology,debitage was thought to contain little useful information and was typically discarded during fieldwork or was minimally considered for laboratory analysis (Andrefsky 2005). Debitage did not start to receive methodical attention until the 1960s, when the focus in archaeology shifted from

descriptiv

(Trigger

Si

stone tech

the relatio

associate

population

formulated

compleme

systematic

The

comparison

early vs. lat

hammer). T

interpret the

assemblage

is to identify

between the

which it orig

complex det

curvature, n

evidence of

pressure, bl

descriptive culture history towards the systematic understanding of the past cultures (Trigger 1989; Whittaker and Stafford 1999).

Since there were only a handful of the modern cultures that still utilized chipped stone technology it was difficult, to say the least, for archaeologists to directly observe the relationship between reduction processes and debitage attributes. In order to associate specific modes of reduction with distinct attributes of individual flakes or populations of flakes archaeologists relied on replicative experiments. This newly formulated approach of analyzing the debitage created by modern flintknappers complemented the emphasis on scientific method that accompanied the shift towards systematic knowledge of past cultures.

These replicative experiments generally follow a similar structure involving a comparison of debitage derived from disparate reduction processes (e.g. core vs. tool, early vs. late stage) or from distinct reduction techniques (e.g. hard hammer vs. soft hammer). There are essentially two analytical approaches used in debitage analysis to interpret the results of replicative experiments; “unique artifact” and “unique assemblage” approaches (Andrefsky 2005:113). The goal of the unique artifact approach is to identify “types” of flakes based on morphology to make a one-to-one association between the flake and the tool reduction/production process or reduction technique from which it originated (Andrefsky 2005:113). Specific flake “types” have multifaceted, complex definitions based on a number of factors (i.e. length to thickness ratios, curvature, number of flake scars on platform and dorsal surfaces, initiation form, evidence of crushing, etc.). Common flake types include; bipolar, biface thinning, pressure, blade, notching, and scraper retouch. Due to a lack of consistent, agreed upon

definitions of flake types and the absences of proof that specific flake types are solely the result of a single reduction process or technique, this approach has seen little methodological attention over the past two decades. Flake type was recorded for all of the debitage from both sites (see Table 5.6), however this data was not considered in this research.

In contrast to unique artifact approaches are unique assemblage approaches which use the relative frequencies of a single flake attribute within a debitage population to make generalizations about the kind(s) of lithic reduction/production processes represented by that population. Attributes such as flake size (Ahler 1989; Andrefsky 2007; Bradbury and Franklin 2000; Shott 1994), flake completeness (Amick and Mauldin 1997; Prentiss 1998; Sullivan and Rozen 1985), flake initiation type (Cotterell and Kamminga 1987; Pelcin 1997b), dorsal cortex cover (Amick et al. 1988; Bradbury and Carr 1995; Bradbury and Carr 1999; Dibble et al. 2005), platform morphology (Morrow 1997; Pelcin 1997a), and dorsal flake scar count (Bradbury and Carr 1995) have all been profitably used to analyze experimentally produced and archaeological debitage populations.

In many ways unique assemblage approaches are an excellent complement to the type of stone tool analysis that is included in this research. As is discussed below, oftentimes these approaches distinguish between late and early stages of reduction or between tool production and core reduction. The flakes removed from relatively unformed objective⁴ pieces during early stages of tool production and core reduction are often the flakes from which expedient tools are made (Parry and Kelly 1987).

⁴ The use of “objective pieces” and “detached pieces” follows Andrefsky 2005. Objective pieces are stone artifacts that are modified by the removal of flakes (e.g. bifaces, scrapers, cores). Detached pieces are the portions of stone removed from objective pieces (i.e. debitage).

Alternatively, the removal of flakes from carefully shaped, highly retouched late stage tools is the means by which heavily curated tools are formed. Based on these relationships, debitage analysis provides an alternate line of evidence for determining elements of the organization of lithic technology at a site. One important difference between tools and debitage is that pieces of debitage were typically deposited at the location of their production or at secondary waste locations nearby (i.e. middens). This is unlike tools, especially curated tools, which were often manufactured, used, and deposited at separate locations (Binford 1979). As a result, debitage can reveal aspects of the organization of technology that are not necessarily evident in the tool assemblage at a site.

The primary analytical advantage of unique assemblage approaches stems from the relative simplicity of the attribute definitions used, allowing for replication and verification of results. That is not to say that there is unanimous agreement over how the various flake attributes “behave” for a given reduction scenario. In fact, there are spirited debates within the literature over how best to measure these variables and over what variables are the most sensitive for identifying reduction processes and techniques. Since the focus of this research is the interpretation of archaeological assemblages only the most robust unique assemblage approaches are utilized. These are discussed in the following section.

Flake Size and Mass Analysis

Perhaps the most widely applied and tested unique assemblage approach is “mass analysis” (MA), in which the relative frequency and/or weights of flakes within discrete size grades are compared across distinct debitage populations to make inferences about

the reduction process from which they derived (Andrefsky 2007: 393). Ahler (1989) is credited with developing this method which allows for large debitage assemblages to be quickly and consistently sorted into size grades using nested screens. In its most basic form MA analysis consists of comparing archaeological debitage deriving from an unknown reduction process/technique to debitage from a replicated reduction process/technique allowing for an assessment of similarity graphically (i.e. histograms) or quantitatively (Andrefsky 2007). While some studies have used MA to identify specific tool reduction processes (e.g. Clovis point production), the most useful studies apply MA towards distinguishing between stages of tool production and/or between tool production and core reduction. The underlying premise of all MA studies is that larger, heavier flakes are more commonly removed earlier in the reduction process, and smaller, lighter flakes are more commonly removed later in the reduction process (Bradbury and Franklin 2000:42).

Morrow (1997) tested the ability of MA to distinguish between the reduction stages of four distinct, experimentally replicated debitage populations (bifacial core, Clovis point, prismatic blade core, and bipolar core). During the manufacture of each artifact Morrow collected the debitage “at intervals roughly corresponding to stages or steps followed during the course of reduction” (Morrow 1997:52). Morrow then sorted the debitage from each stage of the reduction processes into four size grades (0.125 to 0.25 in., 0.25 to 0.5 in., 0.5 to 1.0 in., and > 1 in.) and visually compared the proportion of the size grades by frequency and weight.

Morrow found that the later stages of biface production resulted in noticeably higher proportions of smaller, lighter flakes and that the earlier stages of biface and core

reduction resulted in larger, heavier flakes (Morrow 1997:56). Based on these findings Morrow concluded that “mass analysis is particularly well suited to the quantification of the overall degree of lithic reduction or stages of tool manufacture represented” (Morrow 1997:59). Morrow tempered this conclusion by noting that MA is “rather insensitive to [distinguishing] the types of core forms or reduction strategies employed” (Morrow 1997:59). In essence, MA is useful for making gross distinctions between populations of debitage but it is not appropriate for making one-to-one statements about specific reduction strategies (e.g. blade core reduction) based on flake size distributions.

Bradbury and Franklin (2000) provided a further test of MA by performing discriminant analysis on 207 experimentally reproduced debitage assemblages deriving from seven disparate reduction strategies across five raw material types common to the Southeast United States. The goal of the research was to determine the influence of raw material type on the accuracy of MA discriminant analysis. The seven reduction strategies were; 1) hard hammer cobble testing, 2) hard hammer free hand core reduction, 3) hard hammer bipolar reduction, 4) soft hammer core reduction, 5) hard hammer biface edging, 6) soft hammer biface thinning and, 7) final biface and small tool production. The size grades were slightly different (0.25 – 0.5 in., 0.5 – 0.75 in., 0.75 – 1.0 in., and > 1.0 in.) than those employed by Morrow (1997). The raw material types had variable fracture qualities and generally differed in the size and shape of typical nodules (i.e. different “package size”).

Bradbury and Franklin (2000) found that package size did affect how well the discriminant analyses worked. That is, the best classification functions for one raw material’s package size (e.g. large, tabular chert) were not necessarily the best for another

package size (e.g. small, globular chert). Despite the confounding factor of package size, the discriminant analysis correctly identified the reduction strategy 55.6% of the time for the 207 assemblages (Bradbury and Franklin 2000:48). This level of correct identification was noteworthy given the use of seven different reduction strategies. The authors noted that many of the misidentifications were attributed to similar reduction strategies, for instance hard hammer biface edging flake assemblages were confused with biface thinning flake assemblages. When the reduction strategies were collapsed to just tool production (hard hammer biface edging, soft hammer biface thinning, and final biface and small tool production) and core reduction (hard hammer cobble testing, hard hammer free hand core reduction, hard hammer bipolar reduction, and soft hammer core reduction) the success rate increased to 88.9% for the entire dataset. The most significant discriminating variables identified were the proportions of flakes (by count and weight) in the two smaller size grades, providing additional support for Morrow's (1997) conclusions (Bradbury and Franklin 2000: 48). Based on these findings the authors determined that raw material type did play an important role in determining flake size, but when coarse-grain categories (i.e. core vs. tool reduction) were used MA was still highly accurate despite differences in pack size related to raw material type.

For the MA conducted in this research the debitage were grouped and compared based on depositional context (room, plaza, midden) and raw material type. Since a number of other variables were recorded, the nested screen approach to size segregating flakes was an impractical laboratory method. Instead, maximum flake size was recorded to the nearest 5 mm by centering flakes on a graphic with concentric circles increasing in 5 mm increments. This method provided for consistent measurement of flakes and

eliminated some of the issues accompanying the nested screen method, most notably the problem of elongated flakes not consistently passing through screen mesh grades (Andrefsky 2007). The flake size grades employed closely match those used by Bradbury and Franklin (2000) with slight differences stemming from the metric to English unit conversions (see Table 5.7).

Table 5.7: Mass Analysis Size Classes with English Approximations		
Size Class	Metric Size	Approximate English Size
Size Class 1 (SC1)	10 – 15 mm.	0.25 – 0.5 in.
Size Class 2 (SC2)	15 – 20 mm.	0.50 – 0.75 in.
Size Class 3 (SC3)	20 – 25 mm.	0.75 – 1.0 in.
Size Class 4 (SC4)	> 25 mm.	> 1.0 in.

Mass Analysis Predictions

Due to the similarities between Frank’s Ruin and Pueblo de la Mesa I expect that the raw material types were used in similar manners between the two pueblos and the spatial distribution of reduction activities were also similar, therefore I do not expect to find any significant differences in the MA. I also expect that the MA results will reflect the results of the stone tool analysis. That is, if raw material type A was typically used to fashion curated tools I would expect that the MA for that raw material type would contain a proportionately high number of late stage (i.e. small and light) flakes and few early stage (i.e. large and heavy) flakes. The MA will not be able to determine specific reduction processes (e.g. biface production). In order to make these distinctions one would need to conduct reduction experiments using local raw material types. Although interesting, this is beyond the scope of this thesis. This MA follows the suggestions of Morrow (1997) and Bradbury and Franklin (2000), making coarse distinctions (i.e. core vs. tool, early vs. late stage) among the depositional contexts’ debitage assemblages by

comparing the relative proportions of the different flake size classes. The similarities or differences in these assemblages will then allow for a cursory evaluation of the organization of lithic technology at the two sites.

Although not part of the central question of this thesis, it will also be interesting to see how similar the debitage assemblages are among the depositional contexts at each pueblo. Possible differences among the depositional contexts would suggest that there were significant spatial dimensions to the manufacture, use, and discard of chipped stone implements.

Dorsal Cortex Cover

Cortex is the weathered outer surface of a stone nodule. The amount of cortex on the dorsal surface of flakes is commonly used to ascertain the reduction stage from which the flakes originated. The basic premise for this line of inquiry is that as an objective piece (e.g. biface blank) goes through successive stages of reduction the detached pieces (i.e. flakes) with dorsal cortex will be removed. Since cortex is found only on the outer surface of a nodule it follows that there would be more flakes with dorsal cortex removed earlier in the reduction process and fewer flakes with dorsal cortex removed in later reduction stages. A number of experimental reduction studies have found this relationship to be generally true for a number of reduction strategies and raw material types (Amick et al. 1988; Bradbury and Carr 1999:107).

One of the more common means for comparing debitage assemblages using dorsal cortex is through contrasting the frequency (or weights) of flakes among a set of dorsal cortex classes. Traditionally these classes were “primary”, “secondary” and “tertiary” (PST) but the ambiguity of these quasi-ordinal categories has been eliminated

in favor of explicitly defined classes. Bradbury and Carr (1995) suggest using four dorsal cortex classes: 100% cortex cover, 99 – 50%, 49 – 1%, and 0%. The order of these explicit classes roughly corresponds to the order of the PST classes.

Typical archaeological applications of dorsal cortex analysis proceed in a similar manner to many MA applications. The relative frequencies and/or weights of the flakes in each of the classes are compared among debitage assemblages in order to make relative statements about the stage of reduction represented by each debitage “population.” While the pattern of higher proportions of cortical flakes in the earlier stages of reduction has been generally substantiated there has been recent work that adds nuances to dorsal cortex studies.

Bradbury and Carr (1995) subjected a number of raw material types to successive stages of unique reduction processes to determine the distinguishing ability of dorsal cortex cover studies. They found that flakes with no cortex are common in all stages of reduction, but flakes with high dorsal cortex cover are much more common in the earlier stages of reduction (Bradbury and Carr 1995:102). Based on this, they determined that dorsal cortex cover is best applied towards identifying early reduction stage assemblages through the frequency/weight of high cortex cover flakes.

As in MA, raw material package size and shape is an important consideration for dorsal cortex studies since it can influence the proportion of flakes with dorsal cortex. Both Dibble et al. (2005) and Bradbury and Carr (1995) established that raw material types with different size and shape characteristics can have distinctly different debitage cortex cover proportions, even when the same reduction strategy is employed. Due to the geometric relationship between surface area and volume a large globular nodule of chert

will have less cortex per unit surface area than a nodule of small tabular chert (Bradbury and Carr 1995). Thus, the debitage deriving from the large globular nodule will likely have fewer flakes with significant amounts of cortex cover.

Like the MA conducted for this research the debitage for the dorsal cortex analysis will be grouped and compared based on depositional context (room, plaza, midden) and raw material type. In limiting the analytical groupings to specific raw material types, or at least to similar raw material types, the complicating issue of package size can largely be negated. The dorsal cortex cover classes used follow Bradbury and Carr (1995) and are listed in Table 5.8.

Table 5.8: Dorsal Cortex Classes	
Dorsal Cortex Class	Percentage Cortex Cover
Cortex Class 1 (CC1)	0%
Cortex Class 2 (CC2)	1% – 49%
Cortex Class 3 (CC3)	50% – 99%
Cortex Class 4 (CC4)	100%

Dorsal Cortex Cover Predictions

My predictions for the dorsal cortex cover analysis are essentially the same as the MA predictions. That is, I expect to find no significant differences between how lithic raw materials were reduced at the two pueblos. Since the dorsal cortex amount is best suited for identifying early stage reduction I expect that the assemblages that exhibit early stage reduction for the MA will be the assemblages with the highest proportion of cortex cover flakes. As a result of the package size and shape issue, dorsal cortex cover is a poorer means by which to identify late stage reduction than MA so the results of this analysis will be weighted less heavily when considering the implications of the MA and

the stone tool analysis. However, the advantage of employing this analytical approach is that it might provide partial corroboration (or refutation) of these other analyses.

Unique Assemblage Caveats

Although the debitage analysis approaches employed in this study are two of the strongest lines of inquiry available, there are a few problematic issues that bear discussion. These issues are not unique to MA or to dorsal cortex cover studies; in fact they are ubiquitous for all of the unique assemblage approaches. The first of these, package size, has already been discussed. The second, mixed assemblages, requires some explanation. If an archaeological debitage “population” is actually an amalgamation of two (or more) dissimilar reduction processes the unique assemblage interpretations could be spurious. In a MA, for instance, the distribution of flake frequencies for this hypothetical “population” may or may not reflect either of the “parent” reduction processes, or it may resemble a completely different reduction process. It has been demonstrated that debitage variability can also stem from differences in flintknapper skill, platform angle, and reduction technology (e.g. different masses of hard hammers), so these can also be considered possible contributing factors to assemblage mixing (Andrefsky 2007; Dibble and Pelcin 1995; Shelley 1990).

A number of authors have discussed the problem of mixed assemblages and have offered solutions for minimizing the confounding affects in archaeological assemblages (Ahler 1989; Andrefsky 2004; Bradbury and Franklin 2000; Morrow 1997). The best solution is to analyze separately those debitage populations that reflect distinct behavioral episodes (Andrefsky 2004). One obvious way to do this is to analyze debitage separately by raw material type or at least limit groupings to raw material types that have similar

package sizes and fracture characteristics. A second way is to limit the areal extent of debitage groupings since there is often a spatial component to chipped stone reduction behaviors. Finally, unique assemblage analyses are probably best applied at archeological sites where the range of activities, and therefore reduction processes, were limited (i.e. quarry sites, kill sites) (Andrefsky 2004).

In the debitage analyses utilized in this research I have minimized mixing by limiting analytical populations to groups of identical raw material when possible, and by groups of similar raw materials when distinguishing individual types was impractical. I have also limited the spatial extent of debitage populations by conducting separate analyses for each of the depositional contexts. Clearly the debitage from each depositional context does not literally represent separate behavioral episodes but it is possible, if not likely, that separate types of reduction processes occurred in these distinct contexts so I find this division useful. Limiting the debitage analyses conducted in this research to occupationally and technologically simple sites to limit assemblage mixing is unworkable for this research. There is no doubt that the debitage at both sites represents a range of reduction processes, which does complicate the employment of unique assemblage approaches. I acknowledge this is an issue but I also have confidence that grouping debitage by raw material type and depositional context will mitigate against a great deal of assemblage mixing. It is important to recognize that archaeological assemblages are not the same as experimental debitage populations, in which all of the reduction processes are known before analysis and in many cases directly controlled by researchers. Since the ultimate goal of archaeological research is to make statements

about past behaviors using material remains, the deviation from the ideal “clinical” conditions of experimental debitage studies is necessary.

In taking all of these concerns under consideration the resolution of the interpretations based on the debitage analyses will be relatively coarse (i.e. core vs. tool, early vs. late stage). This level of resolution is an appropriate fit with the type of data available at Frank’s Ruin and Pueblo de la Mesa, while also complimenting the stone tool analysis.

Chapter 6: General Site Comparisons

Introduction

In this chapter the total chipped stone assemblages from Frank's Ruin and Pueblo de la Mesa are compared across the raw material types, raw material proximity types, and stone tool types. This general description of the datasets allows for preliminary comparisons of the assemblages to be made, providing the contexts for more detailed evaluations of the intra-site analyses of Frank's Ruin (Chapters 7) and Pueblo de la Mesa (Chapter 8), and the inter-site comparison of both sites in Chapter 9. Due to the striking similarities in the sites' size, function, location, temporal period, and architectural layout, the general assumption of this study is that there will be no significant differences between the sites. The notably disparate abandonment processes, as well as the difference in the overall length of occupation between the sites could certainly have an affect on the data analyzed for this research. In order to avoid misidentifying the affects of these factors as consequential differences in the organization of lithic technology at the sites, the interpretation of the results are accompanied by a discussion of the logical affects that divergence in abandonment processes and occupation length could have on the artifacts assemblages.

Analysis Interpretive Methods and Naming Conventions (Chapters 6, 7, 8, and 9)

The interpretations of all of the results in this chapter, as well as the subsequent analysis chapters (Chapter 7, 8, and 9), are heavily reliant on EDA, which utilizes graphical means to initially identify patterns in the data before statistical test of significance are used to evaluate the strength of the patterns. Bar charts are the principle graphic device employed for the EDA in this study. Depending on the variable, the

frequency, relative frequency, completeness factor corrected frequency, relative completeness factor corrected frequency, or artifact density may be used for displays and computations. The artifact frequency refers to a simple count of the number of artifacts that fit a given criteria (i.e. depositional context or raw material type). The relative frequency refers to the proportion of the whole that a given artifact count comprises (e.g. the number of CL1 tools in room context divided by the total number of tools from that context). The completeness factor corrected frequency refers to the sum of the completeness factors (see Table 5.5 from Chapter 5) for an artifact type for a given criteria. The relative completeness factor corrected frequency is identical to the relative frequency, except the completeness factor corrected values are used instead of the raw artifact counts. Artifact density refers to the number of artifacts (either frequencies or completeness factor corrected frequencies) for a given criteria divided by the volume (m^3) of excavated deposits from the depositional context. In all cases the method of comparison is clearly labeled.

Analysis Statistical Methods (Chapters 6, 7, 8, and 9)

All of the variables recorded in this study were nominal, or were ordinal data (i.e. debitage size class) that for the purposes of analysis are treated as nominal. As such, the preferred statistical method for comparing the distribution of the variables across separate “populations” (i.e. raw material types, depositional contexts, etc.) is the chi-square test of independence. Contingency tables with the observed and expected values for the chi-square tests calculated in this study are included as tables, except in a handful of instances when summary tables are used to present condensed overviews of multiple chi-square tests. The alpha level of significance for all of the chi-square tests is 0.05. One of

the pitfalls of this commonly used statistical method is small sample size, which is an issue for a number of the chi-square tests in this study. In general the chi-square test is most accurate when the preponderance (>80%) of the expected frequencies are above 5 and none of the observed frequencies are below 1. It is noted in the text when cases did not meet one or both of these conditions. Also noted in the text are instances when the violation of these conditions was severe enough to invalidate the test.

In a number of the inter-site analyses of the core and tool data the Fisher's exact test of independence was used to compare 2x2 contingency tables. The Fisher's exact test provides a more accurate test of independence for 2x2 contingency tables with small observed frequencies than the chi-square test of independence because the null-hypothesis is based on the deviation from a hypergeometric⁵ distribution rather than the theoretical chi-square distribution (Sokal and Rohlf 1989:730). In order for a Fisher's exact test to be considered "significant" in this study the calculated *p-value* must be smaller than 0.05, which is comparable to the level of significance for the chi-square tests.

Rounding of Completeness Factor Corrected Values (Chapters 6, 7, 8, and 9)

In order to meet the requisite data format (i.e. integer count values) for the *Minitab*⁶ statistical package's chi-square tests and Fisher's exact tests the completeness factor corrected frequency data for the artifacts have been rounded up to the nearest integer. Since all of the data are rounded up in the same manner, and there is no reason to assume that rounding will disproportionately "favor" any of the raw materials,

⁵ A hypergeometric distribution is similar to the binomial distribution except that the sample set is a finite population without replacement (i.e. it is a discrete probability distribution)(Sokal and Rohlf 1989:94)

⁶ *Minitab® 15 Statistical Software*, Minitab Inc.

depositional contexts, and/or artifact types there should be a negligible net affect on the relationships evaluated by the statistical tests.

Raw Material Divisions (Chapters 6, 7, 8, and 9)

Two levels of resolution are used to observe the relationship between the stone type(s) and the variables recorded for the artifacts. The highest resolution preserves the stone type groups discussed in Chapter 4, these are: limestone, quartzite, chalcedony, local chert, Mountainair Chert, igneous, obsidian, and “other.” The lower resolution groups the raw material types by their proximity to the sites. The three raw material proximity categories are local (limestone, quartzite, chalcedony, local chert), near-local (Mountainair Chert), and non-local (igneous and obsidian). As discussed in Chapter 4 the local raw materials can be found within 2 km of the sites, near-local materials within 40 km of the sites, and non-local materials are found further than 40 km from the sites.

General Comparison: Overall Chipped Stone Artifact Frequency and Density

Tables 6.1 and 6.2 display the frequency and density of chipped stone artifacts by depositional context at both sites, respectively. The chi-square tests comparing the artifact frequencies by depositional contexts within Frank’s Ruin and Pueblo de la Mesa are displayed in Tables 6.3 and 6.4, respectively. At Frank’s Ruin there is a significant difference in the artifact frequencies among the depositional contexts ($\chi^2 = 32.3$, $\alpha = 0.05$, $df = 4$, critical value = 9.488). The same significant difference was also observed at Pueblo de la Mesa ($\chi^2 = 20.4$, $\alpha = 0.05$, $df = 4$, critical value = 9.488). The assertion of discrete use of space within the pueblos accompanied by unique depositional behaviors among the contexts is reinforced by this finding, bolstering the use of the depositional contexts as an analytical dimension in this study. If there were not significant differences

in the artifact frequencies among the depositional contexts it would signify a more homogenous use of space at both pueblos, at least regarding those behaviors which involved the frequency of artifact deposition. Later in this study (Chapters 7 and 8) a more fine-grain examination of the internal structure of the pueblos, adding the complexity of raw material type, as well as variation in tool, core, and debitage characteristics will provide the higher resolution data necessary to determine if the intra-site spatial variation is solely a matter of volume (i.e. degree), or if there are also differences in type (i.e. kind).

Table 6.1: Completeness Factor Corrected Artifact Frequency for Frank's Ruin and Pueblo de la Mesa			
Frank's Ruin			
Context	Tool	Core	Debitage
Room	30.4	30	233
Plaza	14.5	6.4	144
Midden	19.2	6	339
Total	64.1	42.4	716
Pueblo de la Mesa			
Room	67.8	20	252
Plaza	50.4	21	363
Midden	12.6	14	146
Total	130.8	55	761

Table 6.2: Artifact Density for Frank's Ruin and Pueblo de la Mesa			
Note: tool and core data are completeness factor corrected values			
Frank's Ruin			
Context	Tool	Core	Debitage
Room	1.77	1.75	13.58
Plaza	2.11	0.93	20.98
Midden	7.59	2.37	133.99
Total	2.41	1.60	26.96
Pueblo de la Mesa			
Room	13.32	3.93	49.51
Plaza	18.60	7.75	133.95
Midden	14.16	15.73	164.04
Total	15.05	6.33	87.57

Table 6.3: Intra-Site Chi-Square Comparison of Completeness Factor Corrected Artifact Frequencies Among the Depositional Contexts at Frank's Ruin ($\chi^2 = 32.3$, $\alpha = 0.05$, $df = 4$, critical value = 9.488)			
Context	Tool	Core	Debitage
Room	30.4 (23.5)	30 (15.3)	233 (255)
Plaza	14.5 (13.3)	6.4 (8.65)	144 (144)
Midden	19.2 (29.2)	6 (19)	339 (317)

Table 6.4: Intra-Site Chi-Square Comparison of Completeness Factor Corrected Artifact Frequencies Among the Depositional Contexts at Pueblo de la Mesa ($\chi^2 = 20.4$, $\alpha = 0.05$, $df = 4$, critical value = 9.488)			
Context	Tool	Core	Debitage
Room	67.8 (47.3)	20 (19.7)	252 (273)
Plaza	50.4 (60.6)	21 (25.2)	363 (349)
Midden	12.6 (24.1)	14 (10)	146 (139)

Referencing the density data in Table 6.2 corroborates the differences in the intra-site deposition of artifacts highlighted by the chi-square tests. There is also a general pattern at both sites within the artifact types of lower density in the rooms, higher density in the plaza, with the highest density in the midden. This pattern is not overly surprising given the function of middens as repositories of refuse, compared to the more activity oriented functions of the room and plaza areas. It is interesting that the two rooms included in the Pueblo de la Mesa sample were used as middens after the partial abandonment of the pueblo, yet the overall artifact density from the room context is not nearly as high as the midden context. This could be reflective of the amount of time spent as a midden and/or differential deposition behaviors between “room middens” and extramural midden.

One striking feature of Table 6.2 is the dissimilarity in artifact density between the two sites. There are higher densities in every depositional context and artifact type at Pueblo de la Mesa. This difference ranges from roughly 20% for the middendebitage, to

as high as nearly 800% for the plaza tools. A disparity of this magnitude clearly indicates that there are some important differences between the sites, but whether this variation stems from behavioral differences in degree or from behavioral differences in kind is unclear using only this data.

Tables 6.5, 6.6 and 6.7 display the chi-square tests comparing the Frank's Ruin and Pueblo de la Mesa artifact type frequencies by depositional context. The chi-square

Table 6.5: Inter-Site Chi-Square Comparison of Completeness Factor Corrected Artifact Frequencies from Room Context at Frank's Ruin and Pueblo de la Mesa ($\chi^2 = 13.3$, $\alpha = 0.05$, $df = 2$, critical value = 5.991)

Site	Tool	Core	Debitage
Frank's Ruin	30.4 (45.9)	30 (23.2)	233 (225)
Pueblo de la Mesa	67.8 (53.1)	20 (26.8)	252 (260)

Table 6.6: Inter-Site Chi-Square Comparison of Completeness Factor Corrected Artifact Frequencies from Plaza Context at Frank's Ruin and Pueblo de la Mesa ($\chi^2 = 1.04$, $\alpha = 0.05$, $df = 2$, critical value = 5.991)

Site	Tool	Core	Debitage
Frank's Ruin	14.5 (18.2)	6.4 (7.73)	144 (140)
Pueblo de la Mesa	50.4 (47.8)	21 (20.3)	363 (367)

Table 6.7: Inter-Site Chi-Square Comparison of Completeness Factor Corrected Artifact Frequencies from Midden Context at Frank's Ruin and Pueblo de la Mesa ($\chi^2 = 14.9$, $\alpha = 0.05$, $df = 2$, critical value = 5.991)

Site	Tool	Core	Debitage
Frank's Ruin	19.2 (22.4)	6 (13.6)	339 (329)
Pueblo de la Mesa	12.6 (10.6)	14 (6.43)	146 (156)

tests indicates that there is a significant difference between the room contexts (see Table 6.5, $\chi^2 = 13.3$, $\alpha = 0.05$, $df = 2$, critical value = 5.991) and between the midden contexts (see Table 6.7, $\chi^2 = 14.9$, $\alpha = 0.05$, $df = 2$, critical value = 5.991), but not the between the plaza contexts (see Table 6.6). The significant results indicate that the relative proportions of artifact types are different between the sites. As a preliminary comparison

between the sites this finding is of interest because it suggests that there may be substantial dissimilarities between the Frank's Ruin and Pueblo de la Mesa datasets, especially concerning the room and midden assemblages. Like the other preliminary findings in this section, the more fine-grain analyses conducted later in this study will provide the detail necessary to determine the depth and character of these differences.

General Comparison: Overall Raw Material Use

Along with depositional context, the other primary analytical dimension used in this study is raw material type. This section is an overview of raw material use by artifact type (i.e. tool, core, debitage) within and between the sites. The goal of this section is to identify preliminary patterns in the data that will provide the contexts necessary to understand and interpret the more detailed intra- and inter-site comparisons later in this study.

Table 6.8 displays the frequency of raw material types by artifact type at each of the sites. Table 6.9 presents the relative frequency of the raw material types for all of the artifact types. At both sites Mountainair Chert was the most common raw material used for all of the artifact types. The second and third most common raw material types for the total assemblage were chalcedony and local chert (respectively) at Frank's Ruin, and local chert and chalcedony (respectively) at Pueblo de la Mesa. These three raw material types constitute 76% of the total assemblage at Frank's Ruin and 82% of the Pueblo de la Mesa assemblage, which indicates that the use of the most common raw materials was relatively consistent between the sites.

The primary raw material utilization differences between the sites lie in the less frequently used raw materials. At Frank's Ruin the fourth most common raw material type for the total assemblage was limestone (12%), followed by quartzite (6%), igneous

Table 6.8: Frequency of Raw Material Types by Artifact Type for Frank's Ruin and Pueblo de la Mesa

Note: tool and core data are completeness factor corrected values

Frank's Ruin								
	Limestone	Quartzite	Chalcedony	Local Chert	Mountainair Chert	Igneous	Obsidian	Other
Tools	1.0	0.6	7	16.8	30.3	5	3.4	0
Cores	7	1.4	3	10	20	1	0	0
Debitage	94	48	129	101	310	31	1	2
Sum	102	50	139	127.8	360.3	37	4.4	2
Pueblo de la Mesa								
Tools	0	2.6	24.8	23.5	71.5	2.4	6	0
Cores	1	2	4	8	36	1	3	0
Debitage	36	30	102	126	412	24	28	3
Sum	37	34.6	130.8	157.5	519.5	27.4	37	3

Table 6.9: Relative Frequency of Raw Material Types by Artifact Type at Frank's Ruin and Pueblo de la Mesa

Note: tool and core data are completeness factor corrected values

Frank's Ruin								
	Limestone	Quartzite	Chalcedony	Local Chert	Mountainair Chert	Igneous	Obsidian	Other
Tools	1.1%	2.3%	10.2%	29.5%	43.2%	8.0%	5.7%	0.0%
Cores	16.3%	4.7%	7.0%	23.3%	46.5%	2.3%	0.0%	0.0%
Debitage	13.1%	6.7%	18.0%	14.1%	43.3%	4.3%	0.1%	0.3%
Sum	12.0%	6.1%	16.6%	16.2%	43.4%	4.6%	0.7%	0.2%
Pueblo de la Mesa								
Tools	0.0%	2.2%	18.2%	19.3%	53.6%	1.7%	5.0%	0.0%
Cores	1.8%	3.6%	7.3%	14.5%	1.8%	65.5%	5.5%	0.0%
Debitage	4.7%	3.9%	13.4%	16.6%	54.1%	3.2%	3.7%	0.4%
Sum	3.7%	3.6%	13.9%	17.0%	51.2%	6.3%	4.0%	0.3%

(5%), obsidian (1%), with the catchall "other" type constituting less than 1% of the total. At Pueblo de la Mesa the fourth most common raw material type for the total assemblage was essentially a three-way tie between limestone (4%), quartzite (4%), and obsidian (4%), with igneous (6%) and "other" (< 1%) comprising the remainder. Proportionally limestone is much less important at Pueblo de la Mesa (4%) than it is at Frank's Ruin

(12%), while obsidian (4%) is considerably more common at Pueblo de la Mesa compared to Frank's Ruin (1%).

Table 6.10: Chi-Square Comparison of Raw Material Types at Frank's Ruin and Pueblo de la Mesa ($\chi^2 = 82.5$, $\alpha = 0.05$, $df = 6$, critical value = 12.592) Note: tool and core data are completeness factor corrected values							
	Limestone	Quartzite	Chalcedony	Local Chert	Mountainair Chert	Igneous	Obsidian
Frank's Ruin	102(64.6)	50(39.5)	139(126)	127.8(133)	360.3(410)	37(30.2)	4.4(19.5)
Pueblo de la Mesa	37(74.4)	34.6(45.5)	130.8(144)	157.5(153)	519.5(471)	27.4(34.8)	37(22.5)

Table 6.10 displays the chi-square comparison of the total raw material use between the sites (omitting the "other" category because of low sample size). The chi-square test indicates that there is a significant difference in the total raw material use between the sites ($\chi^2 = 82.5$, $\alpha = 0.05$, $df = 6$, critical value = 12.592). Based on the relative frequencies of raw materials in Table 6.9 and a comparison of the observed and expected frequencies in Table 6.10 it is clear that this significant chi-square value is principally due to the more frequent use of Mountainair Chert and obsidian at Pueblo de la Mesa, and the more frequent use of limestone, quartzite, and chalcedony at Frank's Ruin.

It is unclear why there would be a pronounced difference in the frequency of quartzite, chalcedony, and Mountainair Chert between the sites, since all of these types are locally or near-locally available and the stone qualities (predictable fracture and hardness) are roughly equitable. Perhaps this represents minor differences in proximity to abundant sources of these raw material types or idiosyncratic stone type preferences. Provided the dramatically dissimilar qualities of limestone (i.e. local, poor-quality) and obsidian (non-local, high quality), the divergent use of these raw materials at the sites

suggests that there may have been fundamental differences in the access to extra-local exchange networks or direct procurement opportunities.

Table 6.11: Completeness Factor Corrected Frequency of Raw Material Proximity Types by Artifact Type at Frank's Ruin and Pueblo de la Mesa				
Frank's Ruin				
	Local	Near-Local	Non-Local	Other
Tools	25.4	30.3	8.4	0
Cores	21.4	20	1	0
Debitage	372	310	32	2
Artifacts	418.8	360.3	41.4	2
Pueblo de la Mesa				
Tools	50.9	71.5	8.4	0
Cores	15	36	4	0
Debitage	294	412	52	3
Artifacts	359.9	519.5	64.4	3

Table 6.12: Completeness Factor Corrected Relative Frequency of Raw Material Proximity Types by Artifact Type at Frank's Ruin and Pueblo de la Mesa				
Frank's Ruin				
	Local	Near-Local	Non-Local	Other
Tools	39.6%	47.3%	13.1%	0.0%
Cores	50.5%	47.2%	2.4%	0.0%
Debitage	52.0%	43.3%	4.5%	0.3%
Artifacts	50.9%	43.8%	5.0%	0.2%
Pueblo de la Mesa				
Tools	38.9%	54.7%	6.4%	0.0%
Cores	27.3%	65.5%	7.3%	0.0%
Debitage	38.6%	54.1%	6.8%	0.4%
Artifacts	38.0%	54.9%	6.8%	0.3%

Table 6.11 displays the frequency of local, near-local, and non-local raw material proximity types at the sites by artifact type. Table 6.12 presents the relative frequency of these categories within the artifact types at each pueblo; Figures 6.1 (Frank's Ruin) and 6.2 (Pueblo de la Mesa) illustrate the same data in graphical form. Within the Frank's Ruin assemblage, local raw materials are the predominate type used in each of the artifact types, followed by near-local raw materials. Non-local raw materials at Frank's Ruin are proportionally highest for tools (14%), and are considerably lower for cores (2%) anddebitage (4%).

Figure 6.1: Relative Frequency of Raw Material Proximity Types by Artifact Type at Frank's Ruin

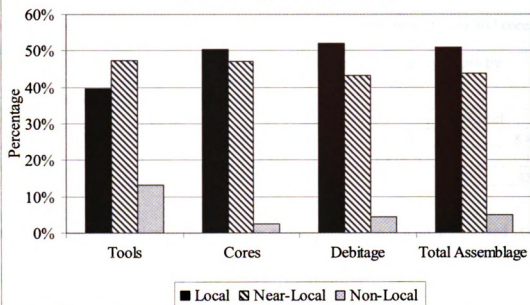


Figure 6.2: Relative Frequency of Raw Material Proximity Types by Artifact Type at Pueblo de la Mesa

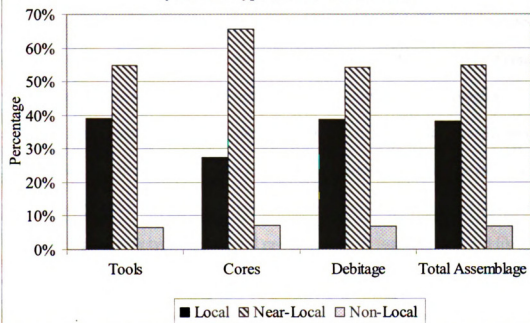


Table 6.13 displays the chi-square comparison of the raw material proximity types by artifact type at Frank's Ruin. This test indicates that there is a significant difference

between the raw material proximity types among the artifact types ($\chi^2 = 12.8$, $\alpha = 0.05$, $df = 4$, critical value = 9.488). This result indicates that raw material use was dependent on artifact type at the site. Since debitage derives from the reduction of tools and cores,

Table 6.13: Chi-Square Comparison of the Raw Material Proximity Types by Completeness Factor Corrected Artifact Type at Frank's Ruin ($\chi^2 = 12.8$, $\alpha = 0.05$, $df = 4$, critical value = 9.488)			
	Local	Near-Local	Non-Local
Tool	25.4(33.7)	30.3(29)	8.4(3.37)
Core	21.4(21.9)	20(18.9)	1(2.19)
Debitage	372(364)	310(313)	32(36.4)

and tool blanks are typically derived from cores, this finding is a bit unexpected. One could conclude from this that the deposited materials at Frank's Ruin may not represent a "closed system." That is, the chipped stone reduction at the site that resulted in the site's debitage assemblage may not be the same reduction event(s) from which the cores and tools were manufactured. In essence, all this indicates is that some of the tools and cores were manufactured "off-site" or some of the tools and cores that were manufactured "on-site" (resulting in the debitage) were not deposited at Frank's Ruin. This is, of course, perfectly reasonable and has been observed ethnographically and archeologically countless times. Judging from the distributions in Figure 6.1 it is clear that the relatively high proportion of non-local materials used for tools coupled with the low representation of non-local types for cores and debitage is the most considerable divergence among the raw material proximity types. Non-local raw materials are logically the most likely types to be reduced off-site, possibly arriving at the site as completed tools instead of raw nodules or cores, which would explain the under representation of non-local materials for debitage and cores.

Within the Pueblo de la Mesa assemblage near-local raw materials are proportionally the most important for every artifact type, ranging from 54% for tools and debitage to 65% for cores (see Table 6.12 and Figure 6.2). Local raw material types are the next most common, ranging from around 40% for tools and debitage to 27% for cores. Non-local raw material types are the least common, comprising 7% of the tool, core, and debitage assemblages.

Table 6.14 displays the chi-square comparison of raw material proximity types by artifact type at Pueblo de la Mesa. This test indicates that there is not a significant difference between the use of raw material proximity types among the artifact types ($\chi^2 = 2.96$, $\alpha = 0.05$, $df = 4$, critical value = 9.488). This finding differs from Frank's Ruin,

Table 6.14: Chi-Square Comparison of the Raw Material Proximity Types by Completeness Factor Corrected Artifact Type at Pueblo de la Mesa ($\chi^2 = 2.96$, $\alpha = 0.05$, $df = 4$, critical value = 9.488)			
	Local	Near-Local	Non-Local
Tool	50.9 (50.3)	71.5 (72.6)	8.4 (9.08)
Core	15 (21.0)	36 (30.3)	4 (3.78)
Debitage	294 (289)	412 (417)	52 (52.1)

suggesting that artifact-dependent raw material choices could have been more important at Frank's Ruin and/or the Pueblo de la Mesa artifact assemblage better represents a "closed system" (i.e. reduction and deposition within the site). I am hesitant to rely on the latter explanation for the Pueblo de la Mesa assemblage's raw material consistency. It seems unlikely that any site type within a complicated social system, let alone a site as complex as a pueblo, would represent a closed reduction/manufacture/deposition system. Instead, it seems that the raw material utilization strategy at Pueblo de la Mesa involved parameters unique from the strategy at Frank's Ruin, requiring a more consistent use of raw materials. Differences in the proximity/access to raw material sources are likely the

cause for the divergent patterns in the consistency of raw material use between the two sites.

Table 6.15: Chi-Square Comparison of the Raw Material Proximity Types for the Debitage at Frank's Ruin and Pueblo de la Mesa ($\chi^2 = 27.0$, $\alpha = 0.05$, $df = 2$, critical value = 5.991)			
	Local	Near-Local	Non-Local
Frank's Ruin	372(323)	310(350)	32(40.7)
Pueblo de la Mesa	294(343)	412(372)	52(43.3)

Table 6.16: Chi-Square Comparison of the Raw Material Proximity Types for the Completeness Factor Corrected Cores at Frank's Ruin and Pueblo de la Mesa ($\chi^2 = 6.32$, $\alpha = 0.05$, $df = 2$, critical value = 5.991)			
	Local	Near-Local	Non-Local
Frank's Ruin	21.4 (16.2)	20 (24.6)	1 (2.19)
Pueblo de la Mesa	15 (20.8)	36 (31.4)	4 (2.81)

Table 6.17: Chi-Square Comparison of the Raw Material Proximity Types for the Completeness Factor Corrected Tools at Frank's Ruin and Pueblo de la Mesa ($\chi^2 = 2.74$, $\alpha = 0.05$, $df = 2$, critical value = 5.991)			
	Local	Near-Local	Non-Local
Frank's Ruin	25.4(25.7)	30.3(34.3)	8.4(6)
Pueblo de la Mesa	50.9(51.3)	71.5(68.7)	8.4(12)

Tables 6.15, 6.16, and 6.17 display the chi-square comparisons of the raw material proximity types for each of the artifact types (debitage, core, and tool, respectively) between Frank's Ruin and Pueblo de la Mesa. The chi-square tests for both the debitage ($\chi^2 = 27$, $\alpha = 0.05$, $df = 2$, critical value = 5.991) and the cores ($\chi^2 = 6.32$, $\alpha = 0.05$, $df = 2$, critical value = 5.991) are significant. Based on the relative frequency data displayed in Figures 6.1 and 6.2 it is clear that the primary difference between the two sites for the debitage and cores is the much higher proportion of near-local raw materials at Pueblo de la Mesa and the greater utilization of local raw materials at Frank's Ruin. The chi-square test of the raw material proximity types for the tools ($\chi^2 = 2.74$, $\alpha = 0.05$,

$df = 2$, critical value = 5.991) is not significant, which is an interesting counterpoint to the debitage and core results. At this point it is unclear why there would be a significant difference between the debitage and core raw material use, but not the tool raw material use between the sites. Subsequent examinations later in this study of the comparative composition of the artifact types between the sites will allow for finer parsing of the data, adding interpretive value to these observations.

General Comparison: Morpho-Functional Tool Types

In this section the completeness factor corrected frequencies of the morpho-functional tools types (e.g. scraper, projectile points, etc.) are overviewed by both raw material type and depositional context at Frank's Ruin and Pueblo de la Mesa. Table 5.2 (Chapter 5) provides a list of all the morpho-functional tool types observed at the sites, along with the curation level designation which will be used later in this study. This overview provides an examination of the more traditional tool type designations used in archaeological research, as opposed to the more general curation level types. The primary goal of this overview is to identify patterns in the tool data that may inform the curation level analyses. Considering that many of the tool types are not common to all of the raw material types and/or depositional contexts, and therefore many of the observed and expected chi-square values would be at or near zero, chi-square tests of independence are not appropriate for evaluating the strength of patterning in this data. Likewise, the number of tool types ($N=22$) makes graphical representation of this data impractical. Instead, a tabulated presentation of this data is used to form an impression of broad patterns across both sites in the tool type distributions. In order to present a more condensed overview of the non-debitage artifacts at the sites the three core types are

included in the tables. Table 5.4 (Chapter 5) provides a list of the curation levels for the core types employed later in this study.

Table 6.18: Completeness Factor Corrected Frequency of Tool and Core Types by Raw Material Type at Frank's Ruin L=Limestone, Q=Quartzite, Ch.=Chalcedony, C=Local Chert, MC=Mountainair Chert, I=Igneous, Ob.=Obsidian, O=Other										
Curation Level	Tool Type	L	Q	Ch.	C	MC	I	Ob.	O	Sum
CL1	Retouched Flake (one margin)	1	0	0	2.6	4.4	0	0.6	0	8.6
CL1	Utilized Block/Shatter	0	0	0	0	1.3	0	0	0	1.3
CL1	Utilized Flake (one margin)	0	0	0.6	0.8	2.8	0.4	0	0	4.6
CL1	Utilized Flake (two non-convergent margins)	0	0	0	1.8	0	0	0	0	1.8
CL2	Retouched Flake (more than one margin)	0	0.4	2.2	2	8.2	0.8	0	0	13.6
CL2	Utilized Flake (more than two margins)	0	0	0	0	1	0	0	0	1
CL2	Utilized Flake (two convergent margins)	0	0	1.4	1.2	4.6	0.6	0	0	7.8
CL3	Biface (Stage 1)	0	0	0	0	0	0	0	0	0
CL3	Biface (Stage 2)	0	0	0	1	0	0	0	0	1
CL3	Biface (Stage 3)	0	0.2	0	0.8	0.2	0	0	0	1.2
CL3	Burin	0	0	0	0	0.4	0	0	0	0.4
CL3	Denticulate	0	0	0	0	0	0	0	0	0
CL3	End Scraper	0	0	1	0.2	1	1	0	0	3.2
CL3	Notch	0	0	0	0.6	1	0.8	0	0	2.4
CL3	Piercer	0	0	0	0.6	3	0	0.6	0	4.2
CL3	Side Scraper	0	0	0	0	0.4	0	0	0	0.4
CL4	Biface (Stage 4)	0	0	0	1	0	0	0	0	1
CL4	Bifacial Knife	0	0	0	0	0	0	0	0	0
CL4	Projectile Point	0	0	1.8	4.2	2	1.4	2.2	0	11.6
CL1	Bipolar Core	1	0	3	9	1	0	0	0	14
CL2	Multidirectional Core	6	1.4	0	1	14	0	0	0	22.4
CL2	Unidirectional Core	0	0	0	0	5	1	0	0	6
	Sum	8	2	10	26.8	50.3	6	3.4	0	106.5

Table 6.18 shows the completeness factor corrected frequency of the tool and core types by raw material type at Frank's Ruin. The infrequently used limestone was employed exclusively for minimally curated flake tools (e.g. retouched flakes) and cores. Interestingly, limestone has a much higher frequency of cores (N=7) than it does tools (N=1), suggesting that tools made of this raw material were deposited offsite, or at least outside of the sampled area. Quartzite, which was also rarely used for tool and core

manufacture, was employed for a wider range of tool types than limestone but was not utilized nearly as much for cores. Local chert and chalcedony, which were the second and third most commonly used tool stones at the site were applied towards a number of uses that ranged across many of the tool and core types. Mountainair Chert, which was the most common tool/core raw material type at the site, was applied towards the widest range of uses. Despite the sparse use of igneous stone for tools and cores (N=6), this raw material type had diverse applications with at least one example for each of the tool curation levels, which suggests a generalized utilization. No examples of obsidian cores were recorded at the site, and the tool use for this raw material type was dominated by highly curated tools (e.g. projectile points). No tools or cores were fashioned out of the “other” raw material types at the site.

In general, the pattern found at Frank’s Ruin seems to be that the more a raw material type was used the more tool/core types it was used for. That is, diversity of uses is directly related to the frequency of use. The high relative quantities of limestone cores and obsidian projectile points at Frank’s Ruin does not seem to be related to this general pattern, which indicates that perhaps these raw material types had a more specialized function within the organization of lithic technology at the site.

Table 6.19 displays the completeness factor corrected frequency of the tool and core types across the depositional contexts at Frank’s Ruin. The room context contains the highest frequency of tools and cores (N=60.4) and has the widest range of tool and cores types. Notably, there is a much higher relative proportion of cores in this context than in any other. The distribution of the rest of the tool and core types in the room context appears to be generally similar to the other contexts except for the relatively

Table 6.19: Tool and Core Type Completeness Factor Corrected Frequencies at Frank's Ruin

Curation Level	Tool/Core Type	Room	Plaza	Midden	Site
CL1	Retouched Flake (one margin)	2	3	3.6	8.6
CL1	Utilized Block/Shatter	0	0.5	0.8	1.3
CL1	Utilized Flake (one margin)	3.4	0.4	0.8	4.6
CL1	Utilized Flake (two non-convergent margins)	1.8	0	0	1.8
CL2	Retouched Flake (more than one margin)	4.4	5.4	3.8	13.6
CL2	Utilized Flake (more than two margins)	1	0	0	1
CL2	Utilized Flake (two convergent margins)	3	1.6	3.2	7.8
CL3	Biface (Stage 1)	0	0	0	0
CL3	Biface (Stage 2)	0	1	0	1
CL3	Biface (Stage 3)	0.6	0.2	0.4	1.2
CL3	Burin	0	0.4	0	0.4
CL3	Denticulate	0	0	0	0
CL3	End Scraper	3	0.2	0	3.2
CL3	Notch	0.8	0	1.6	2.4
CL3	Piercer	2.6	0.6	1	4.2
CL3	Side Scraper	0.4	0	0	0.4
CL4	Biface (Stage 4)	0.2	0	0.8	1
CL4	Bifacial Knife	0	0	0	0
CL4	Projectile Point	7.2	1.2	3.2	11.6
CL1	Bipolar Core	10	5	3	18
CL2	Multidirectional Core	17	0.4	3	20.4
CL2	Unidirectional Core	3	1	0	4
Sum		60.4	20.9	25.2	106.5

high frequency of end scrapers which may reflect a preferential use of this context for processing hides, wood, antler and/or bone. Within the plaza context there are also a wide range of tool and core types represented, with no discernibly significant patterning. That is, no one tool or core type is disproportionately represented within this context. The same can be said of the tools and cores in the midden context, which also have a broad distribution across many of the tool and core types. Beyond the unusually high frequency of cores in the room context there does not appear to be any significant intra-site patterns in the tool and core type data, at least at this preliminary level. The high frequency of cores within the room context could be related to the catastrophic abandonment of the site and the de facto floor assemblages that were observed within the rooms. It seems likely that the non-exhausted cores at Frank's Ruin were either used or stored (or both) within

the rooms, which resulted in their final deposition within that context when the pueblo burned.

As a whole, there seems to be a proportional correspondence between the tool and core types found among the depositional contexts. This suggests that the contexts were all used in a similar manner for the deposition of cores and tools; at least in regards to those behaviors that involved the varieties of cores and tools deposited not necessarily the quantity.

Table 6.20 shows the completeness factor corrected frequency of tool and core types by raw material type at Pueblo de la Mesa. The lone example of limestone at the site is a multidirectional core, which is not unlike the pattern of limestone use found at Frank's Ruin. Much like at Frank's Ruin, quartzite was used for a range of tool and core types at Pueblo de la Mesa despite its infrequent overall use. The same can generally be said of the tool and core distribution for the igneous raw material type at the site. Local chert and chalcedony, the second and third most frequently used stone for tools and cores, saw a wide range of uses at the site which included cores and tools from each of the curation levels. The high relative frequency of local chert projectile points at the site suggests that local chert may have been the favored raw material type for these highly curated tools. Mountainair Chert, the most commonly used raw material at the site, had the widest range of uses, with an example recorded for almost every tool and core type at the site. In contrast to Frank's Ruin, obsidian was more commonly used for cores and lightly curated tools at Pueblo de la Mesa, although there were some projectile points and bifacial knives recorded.

Table 6.20: Completeness Factor Corrected Frequency of Tool and Core Types by Raw Material Type at Pueblo de la Mesa
L=Limestone, Q=Quartzite, Ch.=Chalcedony, C=Local Chert, MC=Mountainair Chert, I=Igneous, Ob.=Obsidian, O=Other

Curatio n Level	Tool Type	L	Q	Ch.	C	MC	I	Ob.	O	Sum
CL1	Retouched Flake (one margin)	0	1	3	2.6	8.2	0	0	0	14.8
CL1	Utilized Block/Shatter	0	0	0	0	0	0	0	0	0
CL1	Utilized Flake (one margin)	0	0	6.8	2.6	13	0.6	2	0	25
CL1	Utilized Flake (two non-convergent margins)	0	0	0	0	0	0	0	0	0
CL2	Retouched Flake (more than one margin)	0	0.6	2.4	3	13	0	2	0	21
CL2	Utilized Flake (more than two margins)	0	0	0	0	0	0	0	0	0
CL2	Utilized Flake (two convergent margins)	0	0	2	1.4	9.2	0	0	0	12.6
CL3	Biface (Stage 1)	0	0	1	0	0.6	0	0	0	1.6
CL3	Biface (Stage 2)	0	0	2.2	0	0.4	0	0	0	2.6
CL3	Biface (Stage 3)	0	0	1.4	1	2.6	0	0	0	5
CL3	Burin	0	0	0	0	1	0	0	0	1
CL3	Denticulate	0	0.4	0	0	1	0	0	0	1.4
CL3	End Scraper	0	0	1	1	5.6	0	1	0	8.6
CL3	Notch	0	0	0	0	3.4	0	0	0	3.4
CL3	Piercer	0	0	0	0	2.6	0	0	0	2.6
CL3	Side Scraper	0	0	0.4	1	3.2	0.8	0	0	5.4
CL4	Biface (Stage 4)	0	0	0	1.7	0.4	0	1	0	2.9
CL4	Bifacial Knife	0	0	0	0.4	0	0	0	0	0.4
CL4	Projectile Point	0	0.6	4.6	8.8	6.9	1	1	0	22.5
CL1	Bipolar Core	0	0	0	4	16	0	1	0	21
CL2	Multidirectional Core	1	1	4	4	20	1	2	0	33
CL2	Unidirectional Core	0	1	0	0	0	0	0	0	1
	Sum	1	4.6	28.8	32	108	3.4	9	0	185.8

In general, the relationship between sample size and tool type diversity that was observed at Frank's Ruin was also found at Pueblo de la Mesa. Based on this general overview of the raw material and core and tool type data there does not seem to be any strong patterns of stone type specific uses at either of the sites. While not the central subject of this research, this information is useful to inform the more generalized (i.e. curation level) tool and core studies later in this chapter.

Table 6.21 displays the completeness factor corrected frequencies of tool and core types by depositional context at Pueblo de la Mesa. Room context, which has the highest

Table 6.21: Tool and Core Type Completeness Factor Corrected Frequencies at Pueblo de la Mesa					
Curation Level	Tool/Core Type	Room	Plaza	Midden	Site
CL1	Retouched Flake (one margin)	8.8	4.6	1.4	14.8
CL1	Utilized Block/Shatter	0	0	0	0
CL1	Utilized Flake (one margin)	15.2	7.8	2	25
CL1	Utilized Flake (two non-convergent margins)	3	1	0	4
CL2	Retouched Flake (more than one margin)	12.2	6.8	2	21
CL2	Utilized Flake (more than two margins)	0	0	0	0
CL2	Utilized Flake (two convergent margins)	4.6	3	1	8.6
CL3	Biface (Stage 1)	0.6	1	0	1.6
CL3	Biface (Stage 2)	1.2	1.4	0	2.6
CL3	Biface (Stage 3)	1.2	3.8	0	5
CL3	Burin	1	0	0	1
CL3	Denticulate	1	0.4	0	1.4
CL3	End Scraper	1	5.6	2	8.6
CL3	Notch	0.6	1.8	1	3.4
CL3	Piercer	2	0.6	0	2.6
CL3	Side Scraper	2.6	1	1.8	5.4
CL4	Biface (Stage 4)	2.7	0.2	0	2.9
CL4	Bifacial Knife	0	0	0.4	0.4
CL4	Projectile Point	10.1	11.4	1	22.5
CL1	Bipolar Core	8	10	8	26
CL2	Multidirectional Core	12	10	6	28
CL2	Unidirectional Core	0	1	0	1
	Sum	87.8	71.4	26.6	185.8

frequency of cores and tools, also has the most diverse assemblage, with almost every type of core and tool represented. Unlike the Frank's Ruin room context there is not a relatively high frequency of cores within the Pueblo de la Mesa rooms. This may reflect the gradual abandonment of the rooms included in the sample and their subsequent use as midden during the later occupations of the site. The plaza context, which also exhibits a high overall core and tool frequency, contains a wide range of cores and tools representing almost all of the observed types. Notably there seems to be a disproportionably high frequency of end scrapers in this context, perhaps reflecting a specialized use for hide preparation and/or processing of wood, antler, and bone.

The cores and tools from midden context, which has the sparsest overall frequency, are not nearly as diverse as the other two contexts. This lack of diversity is

probably related to the small sample size of the midden. Compared to the midden context, both the room and plaza contexts have higher relative frequencies of heavily curated tools. This is especially true for projectile points. The detailed study of the intra-pueblo organization of technology later in this study will allow for an evaluation of the significance of this, and other patterns in the data. It suffices to mention at this point that there are generally no notable differences between the contexts at Pueblo de la Mesa in the tool or core frequencies that would suggest a highly specialized use of the depositional contexts.

General Comparison Discussion

This general description and cursory level comparison of the Frank's Ruin and Pueblo de la Mesa chipped stone assemblages provides the contextual foundation necessary for fruitful interpretation of both the intra- and inter-site analyses of the sites. The most important differences between the sites identified in this chapter were the dramatically dissimilar artifact densities (i.e. much higher density at Pueblo de la Mesa) and the differences in raw material use (especially regarding limestone and obsidian). Notably there did not seem to be any major differences in the morpho-functional tool type frequencies related to either raw material type or depositional context. In the subsequent chapters of this thesis the strengths of the similarities and differences between the sites is further analyzed to determine the level of similarity in the organization of lithic technology.

Chapter 7: Frank's Ruin Intra-Site Analyses

Introduction

In this chapter the intra-site organization of lithic technology at Frank's Ruin is evaluated across the depositional contexts and raw material types using the cortex cover and mass analysis (i.e. size class) variables for the debitage, and the curation level variable for the cores and tools. In the following chapter the same types of analyses are conducted for Pueblo de la Mesa, so the introduction of the intra-site analysis methods provided here are also applicable to Chapter 8. Frequency tables are used to present the raw data, bar graphs are used to display the relative proportions of each variable to help distinguish patterns in the data, and chi-square tests of independence are used to evaluate the significance of perceived patterns within the data (see Chapter 6 for explanation of interpretive methods). Both the raw material types and raw material proximity types are discussed in these analyses to provide a "fine-grain" and "coarse-grain" perspective of the data. There is a high level of detail presented in the intra-site comparisons, which often results in the analysis of relatively small subsets of data. As such, many of the chi-square comparisons have quite low observed and expected values (especially for the core and tool data), which necessitates the use of the raw material proximity types for the chi-square comparisons to meet the requisite frequencies.

The structure of the Frank's Ruin (this chapter) and Pueblo de la Mesa (Chapter 8) intra-site analyses is the same. Debitage is the first artifact type discussed, followed by cores and tools. Within each of these artifact types the different variables are examined by raw material type and raw material proximity type across the depositional contexts (room, plaza, and midden) and at a more general site-wide level. The goal of

these comprehensive analyses is to provide the baseline knowledge necessary to evaluate the organization of lithic technology at each site. This information will ultimately inform the degree of similarity identified in the inter-site comparisons, which addresses the principal goal of this study. The abundant permutations of the debitage, core, and tool analyses also provide multiple points of comparisons for the inter-site assessment. Since this thesis is the only published outlet for this research the detailed overview of the intra-site chipped stone artifact composition also functions as a descriptive report for both sites.

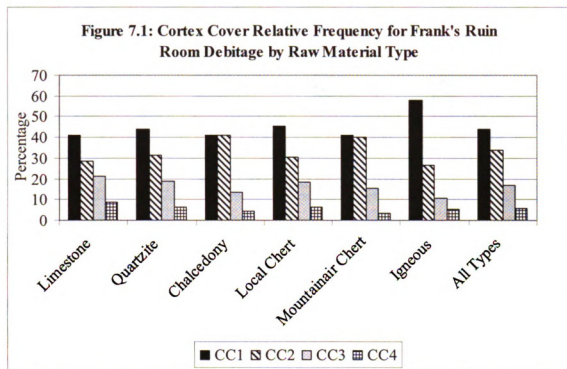
Frank's Ruin Debitage: Room Cortex Cover

Tables 7.1 and 7.2 present the frequency of cortex cover classes for the debitage from the room context by raw material type and raw material proximity type, respectively. Figures 7.1 and 7.2 illustrate the relative frequency of the cortex cover classes for the debitage from room context by raw material type and raw material proximity type, respectively. In Figure 7.1 most of the distributions follow a similar trend, with CC1 as the most common flake type and the other cortex cover classes descending in order of importance from CC2 flakes to CC4 flakes. The notable divergences from this pattern are chalcedony and Mountainair Chert, which have higher relative proportions of CC2 flakes. The other noticeable difference is the high relative

Table 7.1: Frequency of Cortex Cover Classes by Raw Material Type for Frank's Ruin Room Debitage Note: Mtn. Chert = Mountainair Chert									
	Limestone	Quartzite	Chalcedony	Local Chert	Mtn. Chert	Igneous	Obsidian	Other	All Types
CC1	23	7	9	15	35	11	1	1	102
CC2	16	5	9	10	34	5	0	0	79
CC3	12	3	3	6	13	2	0	0	39
CC4	5	1	1	2	3	1	0	0	13
Sum	56	16	22	33	85	19	1	1	233

Table 7.2: Frequency of Cortex Cover Classes by Raw Material Proximity Type for Frank's Ruin Room Debitage

	Local	Near-Local	Non-Local	All Types
CC1	54	35	12	101
CC2	40	34	5	79
CC3	24	13	2	39
CC4	9	3	1	13
Sum	127	85	20	232



proportion of CC1 flakes for the igneous debitage, suggesting that late stages of reduction may have been more common for this raw material type. The high overall relative frequencies of CC1 and CC2 flakes across all of the raw material types suggests that later stages of reduction were likely the dominant mode of reduction in this context. The raw material proximity type distributions displayed in Figure 7.2 demonstrates a similar pattern of predominately little or no cortex cover on debitage, underscoring the importance of later stages of reduction in the room context.

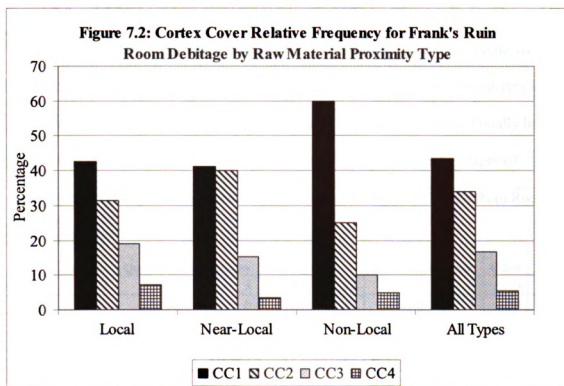


Table 7.3 presents the chi-square comparison of cortex cover classes among the raw material proximity types for the room context. This chi-square test indicates that there is not a significant difference among the distributions ($\chi^2 = 5.153$, $\alpha = 0.05$, $df = 6$, critical value = 12.592).

	Local	Near-Local	Non-Local
CC1	54 (55.29)	35 (37)	12 (8.71)
CC2	40 (43.25)	34 (28.94)	5 (6.81)
CC3	24 (21.35)	13 (14.29)	2 (3.36)
CC4	9 (7.12)	3 (4.76)	1 (1.12)

Frank's Ruin Debitage: Room Size Class

Tables 7.4 and 7.5 present the frequency of size classes for the debitage from room context by raw material type and raw material proximity type, respectively.

Figures 7.3 and 7.4 illustrate the relative frequency of the size classes for the debitage from room context by raw material type and raw material proximity type, respectively. In Figure 7.3, limestone, quartzite, Mountainair Chert and igneous all have relatively high frequencies of the large SC4 debitage, with the smaller flake sizes proportionally less important. This pattern suggests that for these raw material types, later stages of

Table 7.4: Frequency of Size Classes by Raw Material Type for Frank's Ruin Room Debitage

Note: Mtn. Chert = Mountainair Chert

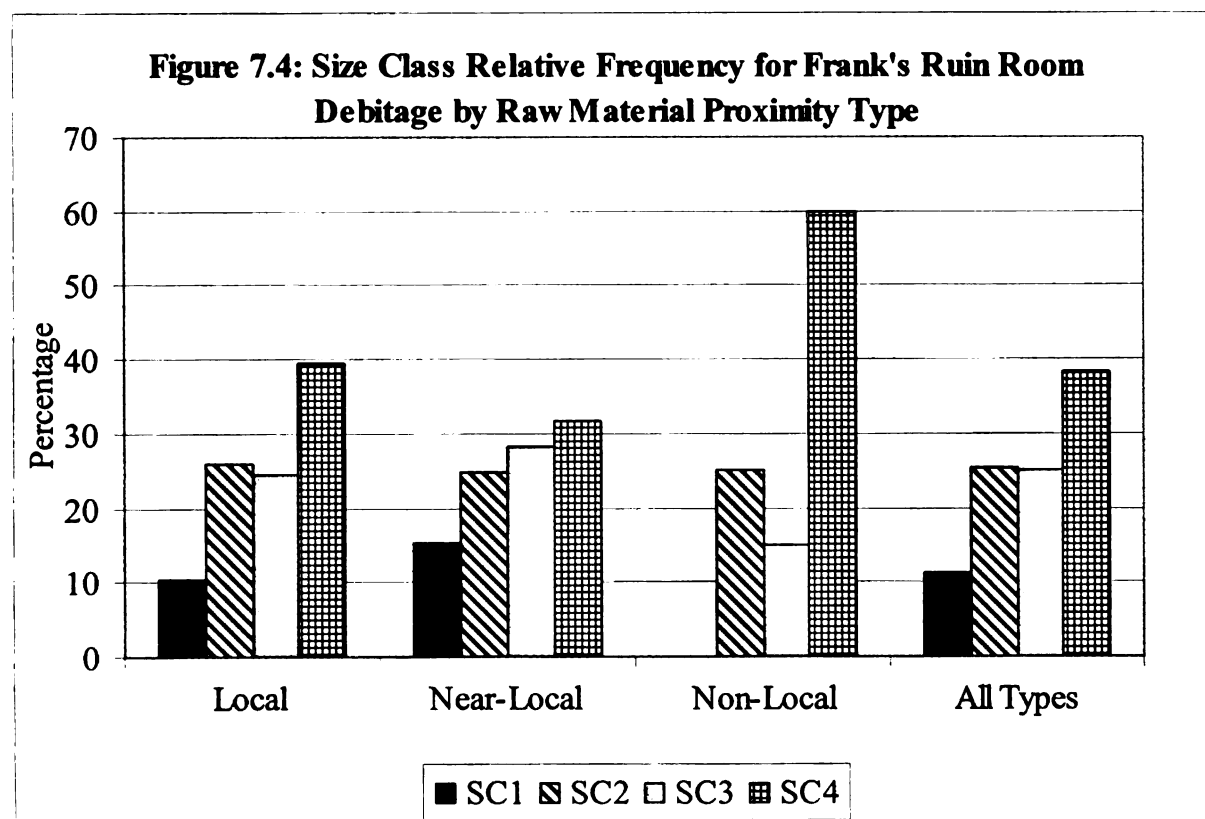
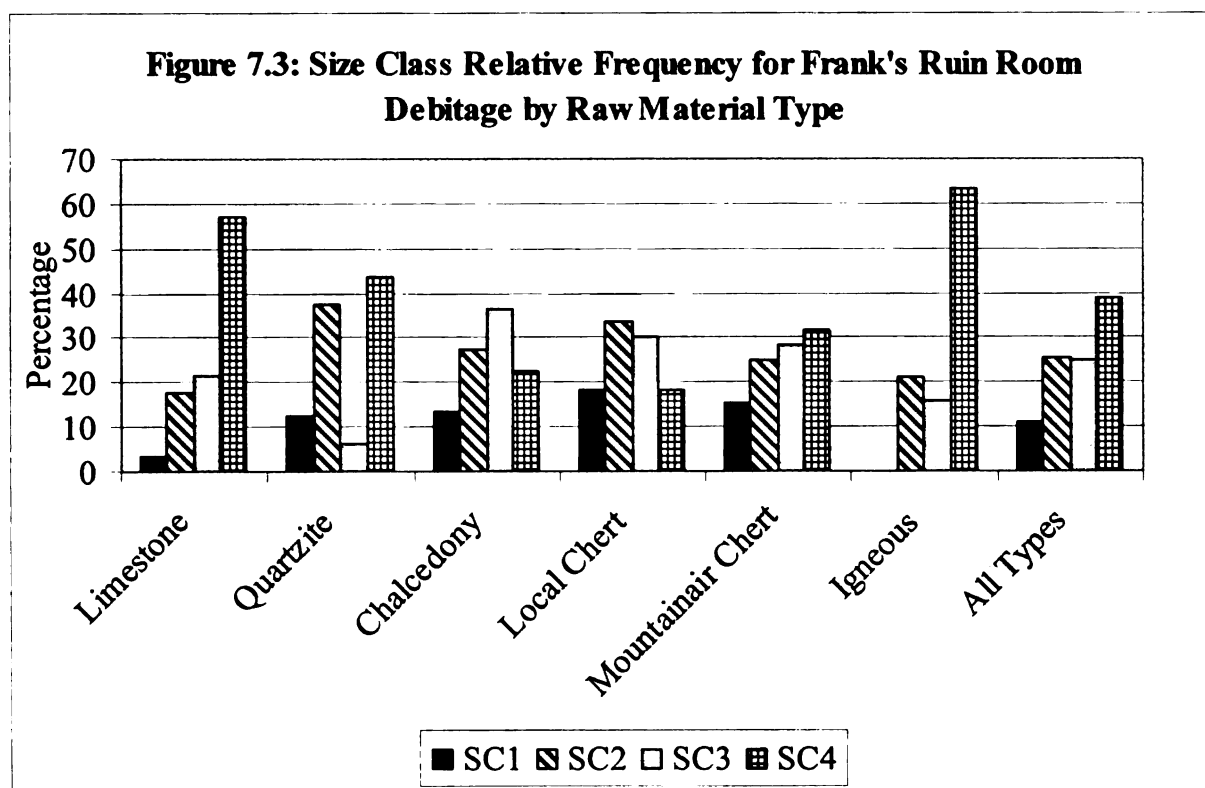
	Limestone	Quartzite	Chalcedony	Local Chert	Mtn. Chert	Igneous	Obsidian	Other	All Types
SC1	2	2	3	6	13	0	0	0	26
SC2	10	6	6	11	21	4	1	0	59
SC3	12	1	8	10	24	3	0	0	58
SC4	32	7	5	6	27	12	0	1	90
sum	56	16	22	33	85	19	1	1	233

Table 7.5: Frequency of Size Classes by Raw Material Proximity Type for Frank's Ruin Room Debitage

	Local	Near-Local	Non-Local	All Types
SC1	13	13	0	26
SC2	33	21	5	59
SC3	31	24	3	58
SC4	50	27	12	89
Sum	127	85	20	232

reduction were less important than earlier stages. The large average package size for limestone noted in Chapter 4 could certainly influence the high frequency of large debitage for this raw material type. The average package size for quartzite and Mountainair Chert is comparable to the other raw material types at the site, so a real difference in reduction strategy is possible for these materials. The average package size for the igneous materials is unknown, which makes interpreting size class data difficult for this type. Although not the largest flake size, there are high frequencies of SC3

debitage for chalcedony and local chert, indicating that earlier stages of reduction were common for these raw material types as well.



The raw material proximity type data presented in Figure 7.4 indicates that the local and near-local size class distributions are similar, with the predominance of larger flakes indicating that earlier stages of reduction may have been the most common mode of reduction. Early stages of reduction are also implicated for the non-local raw materials, with its high frequency of SC4debitage. However, 25% to 40% of all of the raw material proximity type distributions are comprised of smaller debitage, indicating that later stages of reduction were also present in the room context.

Table 7.6: Chi-Square Comparison of the Size Classes by Raw Material Proximity Type for Frank's Ruin Room Debitage ($\chi^2 = 8.262$, $\alpha = 0.05$, $df = 6$, critical value = 12.592)			
	Local	Near-Local	Non-Local
SC1	13 (14.2)	13(9.5)	0(2.2)
SC2	33(32.3)	21(21.6)	5(5)
SC3	31(31.7)	24(21.2)	3(5)
SC4	50(48.7)	27(32.6)	12(7.6)

Table 7.6 shows the chi-square comparison of the size classes among the raw material proximity types from room context. This chi-square test indicates that there is not a significant difference among the raw material proximity types ($\chi^2 = 8.262$, $\alpha = 0.05$, $df = 6$, critical value = 12.592).

Frank's Ruin Debitage: Room Summary

There is far from a perfect association between what can be inferred about reduction strategies in the room context using the cortex cover data and what can be inferred using the size class data. The cortex cover data indicate that late stage reduction was the dominate mode, while the size class data indicate that earlier stages of reduction were most common. It is important to bear in mind that while both variables "measure" the level of reduction in debitage populations, there are a number of factors that can

confound the results of either analysis including the removal of cortex off-site and differences in average package size.

Frank's Ruin Debitage: Plaza Cortex Cover

Tables 7.7 and 7.8 display the frequency of cortex cover classes for thedebitage from plaza context by raw material type and raw material proximity type, respectively.

Figures 7.5 and 7.6 display the relative frequency of the cortex cover classes by raw

Table 7.7: Frequency of Cortex Cover Classes by Raw Material Type for Frank's Ruin Plaza Debitage

Note: Mtn. Chert = Mountainair Chert, Chal. = Chalcedony

	Limestone	Quartzite	Chal.	Local Chert	Mtn. Chert	Igneous	Obsidian	Other	All Types
CC1	2	10	14	19	30	1	0	0	76
CC2	2	5	13	11	16	0	0	0	47
CC3	0	0	5	2	7	1	0	0	15
CC4	2	0	0	0	4	0	0	0	6
sum	6	15	32	32	57	2	0	0	144

Table 7.8: Frequency of Cortex Cover Classes by Raw Material Proximity Type for Frank's Ruin Plaza Debitage

	Local	Near-Local	Non-Local	All Types
CC1	45	30	1	76
CC2	31	16	0	47
CC3	7	7	1	15
CC4	2	4	0	6
Sum	85	57	2	144

material type and raw material proximity type. Across most of the distributions in Figure 7.5 flakes with minimal cortex cover (CC1 and CC2) are the most common. This pattern suggests that later stages of reduction were more common for most of the raw material types. Both limestone and igneous, which have small sample sizes (N=6 and N=2, respectively), have higher frequencies of flakes with more cortex cover (i.e. CC3 and CC4). This could indicate that earlier stages of reduction were more common for these raw material types, but the small samples make this interpretation tentative. The coarser

Figure 7.5: Cortex Cover Relative Frequency for Frank's Ruin Plaza Debitage by Raw Material Type

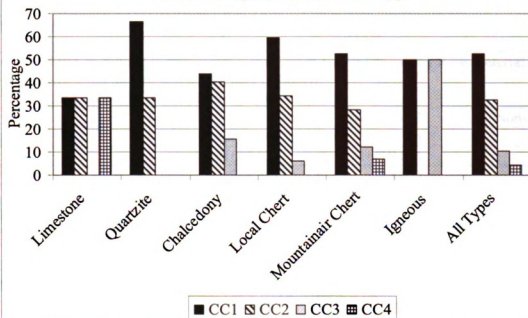
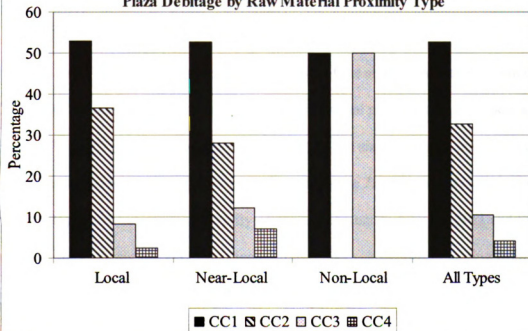


Figure 7.6: Cortex Cover Relative Frequency for Frank's Ruin Plaza Debitage by Raw Material Proximity Type



resolution data exhibited in Figure 7.6 indicate that the general trend (i.e. late stage reduction) observed at the finer resolution also holds true across all of the raw material proximity categories.

Table 7.9: Chi-Square Comparison of the Cortex Cover Classes by Raw Material Proximity Type for Frank's Ruin Plaza Debitage ($\chi^2 = 3.051$, $\alpha = 0.05$, $df = 3$, critical value = 7.815)			
	Local	Near-Local	Non-Local
CC1	45(44.89)	30(30.11)	NA
CC2	31(28.13)	16(18.87)	NA
CC3	7(8.38)	7(5.62)	NA
CC4	2(3.59)	4(2.41)	NA

Table 7.9 displays the chi-square comparison of the cortex cover classes among the raw material proximity types. The “non-local” type was excluded from the comparison because of small sample size ($N=2$). The chi-square test indicates that there is not a significant difference between the local and near-local raw material proximity types ($\chi^2 = 3.051$, $\alpha = 0.05$, $df = 3$, critical value = 7.815).

Frank's Ruin Debitage: Plaza Size Class

Tables 7.10 and 7.11 present the frequency of the size classes for thedebitage from plaza context by raw material type and raw material proximity type, respectively. Figures 7.7 and 7.8 display the relative frequency of the size classes by raw material type and raw material proximity type, respectively. In Figure 7.7 the majority of the raw material type distributions are primarily comprised of smallerdebitage (SC1 and SC2), although there are significant proportions of larger flake size classes (ranging from roughly 30% to 40% of the total) for most raw material types. This pattern suggests that later stages of reduction were the most common, but earlier stages of reduction were also

important in this context. The possibility of middle stage reduction and/or a mix of early and late stage reduction are also possible explanations for these distributions.

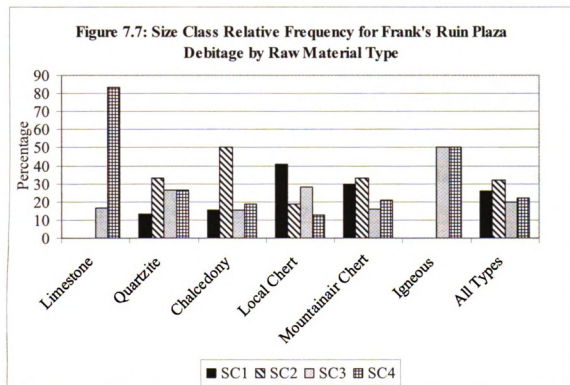
Table 7.10: Frequency of Size Classes by Raw Material Type for Frank's Ruin Plaza Debitage

Note: Mtn. Chert = Mountainair Chert, Chal. = Chalcedony

	Limestone	Quartzite	Chal.	Local Chert	Mtn. Chert	Igneous	Obsidian	Other	All Types
SC1	0	2	5	13	17	0	0	0	37
SC2	0	5	16	6	19	0	0	0	46
SC3	1	4	5	9	9	1	0	0	29
SC4	5	4	6	4	12	1	0	0	32
sum	6	15	32	32	57	2	0	0	144

Table 7.11: Frequency of Size Classes by Raw Material Proximity Type for Frank's Ruin Plaza Debitage

	Local	Near-Local	Non-Local	All Types
SC1	20	17	0	37
SC2	27	19	0	46
SC3	19	9	1	29
SC4	19	12	1	32
Sum	85	57	2	144



The limestone and igneous distributions are different than the rest of the raw material types, with the majority of flakes in the larger size classes (SC3 and SC4), suggesting an early stage of reduction. The small sample sizes for limestone and igneous make it difficult to substantiate this assertion. The raw material proximity type distributions shown in Figure 7.8 indicate a similar trend of middle and/or mixed stages of reduction in the plaza context for the local and near-local materials.

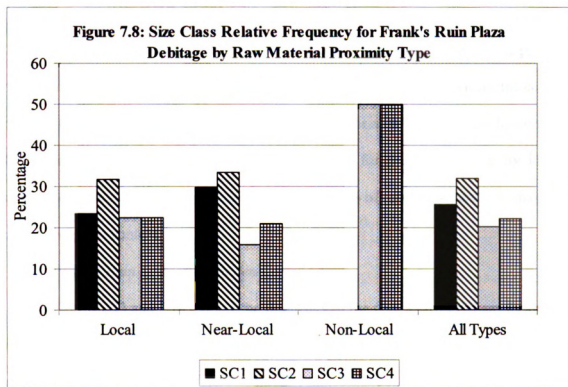


Table 7.12: Chi-Square Comparison of the Size Classes by Raw Material Proximity Type for Frank's Ruin Plaza Debitage
($\chi^2 = 1.317$, $\alpha = 0.05$, $df = 3$, critical value = 7.815)

	Local	Near-Local	Non-Local
SC1	20(22.1)	17(14.8)	NA
SC2	27(27.5)	19(18.4)	NA
SC3	19(16.7)	9(11.2)	NA
SC4	19(18.5)	12(12.4)	NA

Table 7.12 presents the chi-square comparison of the size classes between the local and near-local raw material proximity types. As in the cortex cover chi-square comparison, the “non-local” category was omitted from the analysis due to small sample size (N=2). The chi-square test indicates that there is not a significant difference between the local and near-local raw material types ($\chi^2 = 1.317$, $\alpha = 0.05$, $df = 3$, critical value = 7.815).

Frank's Ruin Debitage: Plaza Summary

The cortex cover and size class variables correspond more closely in the plaza context than they did in the room context. Excepting limestone and igneous, the common modes of reduction appear to be mostly from the later or middle stages of reduction. However, the relatively high frequency of larger flakes for quartzite, chalcedony, local chert, and Mountainair Chert indicate that earlier stages of reduction were not uncommon within the plaza context.

Frank's Ruin Debitage: Midden Cortex Cover

Tables 7.13 and 7.14 display the frequency of the cortex cover classes for thedebitage from midden context by raw material type and raw material proximity type, respectively. Figures 7.9 and 7.10 present the relative frequency of the cortex cover classes for the midden contextdebitage by raw material type and raw material proximity type, respectively. In Figure 7.9, limestone, quartzite, chalcedony, local chert, Mountainair Chert, and igneous all have similar distributions, with the majority of flakes exhibiting no (CC1) or minimal (CC2) cortex cover, suggesting later stages of reduction. Quartzite and igneous both have higher proportions of CC1 flakes than the rest of the raw material types, indicating an almost exclusive application of late stage reduction. The

Table 7.13: Frequency of Cortex Cover Classes by Raw Material Type for Frank's Ruin Midden Debitage

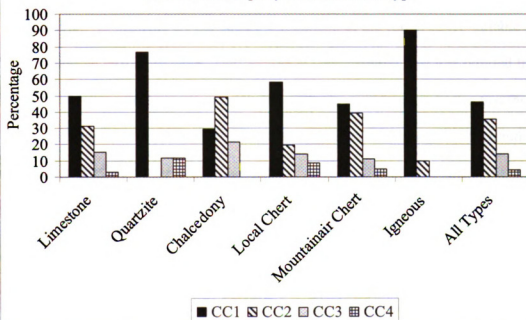
Note: Mtn. Chert = Mountainair Chert, Chal. = Chalcedony

	Limestone	Quartzite	Chal.	Local Chert	Mtn. Chert	Igneous	Obsidian	Other	All Types
CC1	16	13	22	21	75	9	0	1	157
CC2	10	0	37	7	66	1	0	0	121
CC3	5	2	16	5	19	0	0	0	47
CC4	1	2	0	3	8	0	0	0	14
sum	32	17	75	36	168	10	0	1	339

Table 7.14: Frequency of Cortex Cover Classes by Raw Material Proximity Type for Frank's Ruin Midden Debitage

	Local	Near-Local	Non-Local	All Types
CC1	72	75	9	156
CC2	54	66	1	121
CC3	28	19	0	47
CC4	6	8	0	14
Sum	160	168	10	338

Figure 7.9: Cortex Cover Relative Frequency for Frank's Ruin Midden Debitage by Raw Material Type



raw material proximity type data displayed in Figure 7.10 indicates a similar pattern, with local, near-local, and non-local debitage all typified by little or no cortex cover.

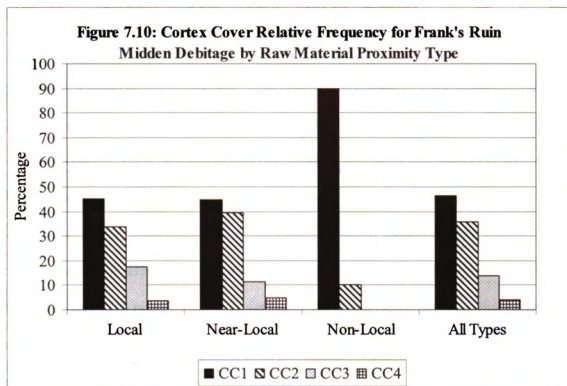


Table 7.15 presents the chi-square comparison of the cortex cover variable across the raw material proximity types. The “non-local” raw material type was omitted from the analysis due to small sample size ($N=10$). The chi-square test indicates that there is not a significant difference between the local and near-local cortex cover distributions ($\chi^2 = 3.077$, $\alpha = 0.05$, $df = 3$, critical value = 7.815).

	Local	Near-Local	Non-Local
CC1	72(71.7)	75(75.2)	NA
CC2	54(58.5)	66(61.4)	NA
CC3	28(22.9)	19(24.07)	NA
CC4	6(6.8)	8(7.1)	NA

Frank's Ruin Debitage: Midden Size Class

Tables 7.16 and 7.17 show the frequency of the size classes for the debitage from midden context by raw material type and raw material proximity type, respectively.

Figures 7.11 and 7.12 illustrate the relative frequency of the size classes by raw material type and raw material proximity type, respectively. In Figure 7.11 the distributions of quartzite, chalcedony, local chert, and Mountainair Chert are all principally comprised of smaller flakes (SC1 and SC2), which is indicative of later stages of reduction. However, there are still significant proportions of larger flakes (SC3 and SC4) for chalcedony and Mountainair Chert, which may indicate that early stages of reduction were also components of the use of these raw materials. The distributions of limestone and igneous have relatively high proportions of larger flakes (SC3 and SC4), implying that earlier stages of reduction were of predominant importance for these raw material types. This is especially true for limestone, which is almost exclusively comprised of SC3 and SC4

Table 7.16: Frequency of Size Classes by Raw Material Type for Frank's Ruin Midden Debitage

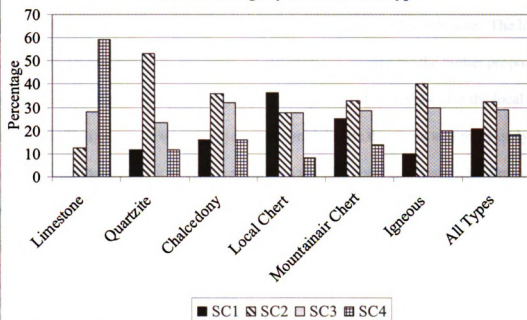
Note: Mtn. Chert = Mountainair Chert, Chal. = Chalcedony

	Limestone	Quartzite	Chal.	Local Chert	Mtn. Chert	Igneous	Obsidian	Other	All Types
SC1	0	2	12	13	42	1	0	0	70
SC2	4	9	27	10	55	4	0	1	110
SC3	9	4	24	10	48	3	0	0	98
SC4	19	2	12	3	23	2	0	0	61
sum	32	17	75	36	168	10	0	1	339

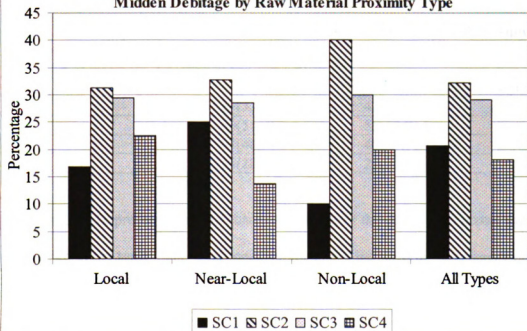
Table 7.17: Frequency of Size Classes by Raw Material Proximity Type for Frank's Ruin Midden Debitage

	Local	Near-Local	Non-Local	All Types
SC1	27	42	1	70
SC2	50	55	4	109
SC3	47	48	3	98
SC4	36	23	2	61
Sum	160	168	10	338

**Figure 7.11: Size Class Relative Frequency for Frank's Ruin
Midden Debitage by Raw Material Type**



**Figure 7.12: Size Class Relative Frequency for Frank's Ruin
Midden Debitage by Raw Material Proximity Type**



flakes. The large average package size for limestone could also be a contributing factor to this trend.

The raw material proximity type data displayed in Figure 7.12 conveys a slightly different picture of the size class data for the Frank's Ruin midden debitage. The local and near-local raw materials have similar distributions, except for the higher proportion of SC4 flakes with a correspondingly smaller frequency of SC1 flakes for the local raw materials. This pattern is interesting since it could denote that there was more early stage reduction for the local raw materials relative to the near-local raw materials. From an organization of lithic technology stand point this is intuitive since the debitage deriving from local raw materials, which can be found in the immediate vicinity of the site, would likely represent more of the total reduction sequence (i.e. early, middle, and late stages) than debitage that is not local. Non-local debitage, which had a similar distribution to the local raw materials, was rare in the midden context (N=10) making "trends" difficult to substantiate.

Table 7.18: Chi-Square Comparison of the Size Classes by Raw Material Proximity Type for Frank's Ruin Midden Debitage ($\chi^2 = 6.18$, $\alpha = 0.05$, $df = 3$, critical value = 7.815)			
	Local	Near-Local	Non-Local
SC1	27(33.7)	42(35.3)	NA
SC2	50(51.2)	55(53.8)	NA
SC3	47(46.3)	48(48.7)	NA
SC4	36(28.8)	23(30.2)	NA

Table 7.18 presents the chi-square comparison of the size classes across the raw material proximity types. The "non-local" type was not included in the comparison due to small sample size (N=10). The chi-square test indicates that there is not a significant difference between the local and non-local size classes ($\chi^2 = 6.18$, $\alpha = 0.05$, $df = 3$, critical

value =7.815). This finding is of interest because it indicates that the differences between local and near-local raw material types detected in the Figure 7.12 (discussed above) are either superficial or are not pronounced enough to be significant.

Frank's Ruin Debitage: Midden Summary

Much like thedebitage data from the plaza context there is greater correspondence between the cortex cover and size class variables in the midden context. Both indicate that later stages of reduction were the most important mode of reduction in the midden context for the majority of raw material types (quartzite, chalcedony, local chert, and Mountainair Chert). There is, however, discordance between the cortex cover and size class variables for limestone. The cortex cover data suggests late stage reduction while the size class data are indicative of predominately early stage reduction. Due to the large average package size of limestone it is not surprising that many of the limestone flakes are also large, which helps to explain this incongruity.

Frank's Ruin Debitage: Site Cortex Cover

Tables 7.19 and 7.20 display the frequency of the cortex cover classes for thedebitage from the entire site by raw material type and raw material proximity type, respectively. Figures 7.13 and 7.14 illustrate the relative frequency of the cortex cover classes by raw material type and raw material proximity type, respectively. In Figure 7.13 all of the raw materials have generally similar distributions. Flakes bearing minimal cortex cover (CC1 and CC2) are the most common, with higher cortex cover flakes (CC3 and CC4) comprising less of the distributions, ranging from roughly 20% to 30% of the total. Not surprisingly this pattern resonates with the results from the individual depositional contexts, in which the paucity of cortical flakes suggested a general reliance

on later

debitag

instanc

Table
Ruin
Note

CC1
CC2
CC3
CC4
Sum

Tab
Frar
CC
CC
CC
CC
Sur

iden

cont

prin

cor

has

pre

on later stages of reduction at Frank's Ruin. The relatively high frequency of CC2 debitage for chalcedony is unlike the other distributions and may reflect a slightly higher instance of early stage reduction.

Table 7.19: Frequency of Cortex Cover Classes by Raw Material Type for Frank's Ruin Debitage

Note: Mtn. Chert = Mountainair Chert, Chal. = Chalcedony

	Limestone	Quartzite	Chal.	Local Chert	Mtn. Chert	Igneous	Obsidian	Other	All Types
CC1	41	30	45	55	140	21	1	2	335
CC2	28	10	59	28	116	6	0	0	247
CC3	17	5	24	13	39	3	0	0	101
CC4	8	3	1	5	15	1	0	0	33
Sum	94	48	129	101	310	31	1	2	716

Table 7.20: Frequency of Cortex Cover Classes by Raw Material Proximity Type for Frank's Ruin Debitage

	Local	Near-Local	Non-Local	All Types
CC1	171	140	22	333
CC2	125	116	6	247
CC3	59	39	3	101
CC4	17	15	1	33
Sum	372	310	32	714

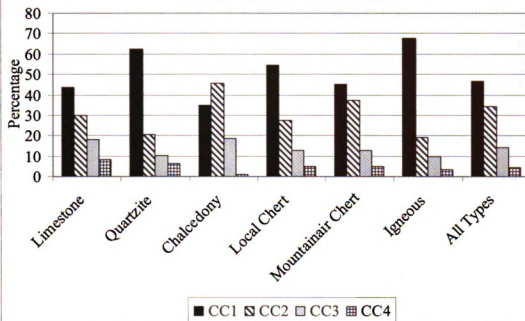
The raw material proximity type data displayed in Figure 7.14 matches the trends identified in Figure 7.13, and to a large extent the distributions found in the individual contexts (see Figures 7.2, 7.6, and 7.10). The local and near-local distributions contain primarily flakes with little or no dorsal cortex with much smaller proportions of high cortex cover flakes, suggesting mostly late stage reduction. The non-local distribution has even fewer cortical flakes, indicating that late stage reduction was even more prevalent for these raw materials.

80
70
60
50
40
30
20
10
0

Percentage

Percentage

**Figure 7.13: Cortex Cover Relative Frequency for Frank's Ruin
Debitage by Raw Material Type**



**Figure 7.14: Cortex Cover Relative Frequency for Frank's Ruin
Debitage by Raw Material Proximity Type**

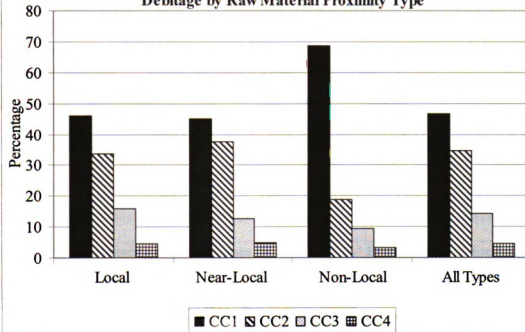


Table
Proxi
 $\chi^2 =$

CC1
CC2
CC3
CC4

the ray
signifi
=12.5

from
Figure

Tab
De
No
SC
SC
SC
SC
Su

Ta
R
SC
SC
SC
SC
Su

Table 7.21: Chi-Square Comparison of the Cortex Cover Classes by Raw Material Proximity Type for Frank's Ruin Debitage ($\chi^2 = 8.692$, $\alpha = 0.05$, $df = 6$, critical value = 12.592)			
	Local	Near-Local	Non-Local
CC1	171(173.5)	140(144.5)	22(14.9)
CC2	125(128.6)	116(107.2)	6(11.0)
CC3	59(52.6)	39(43.8)	3(4.53)
CC4	17(17.1)	15(14.3)	1(1.48)

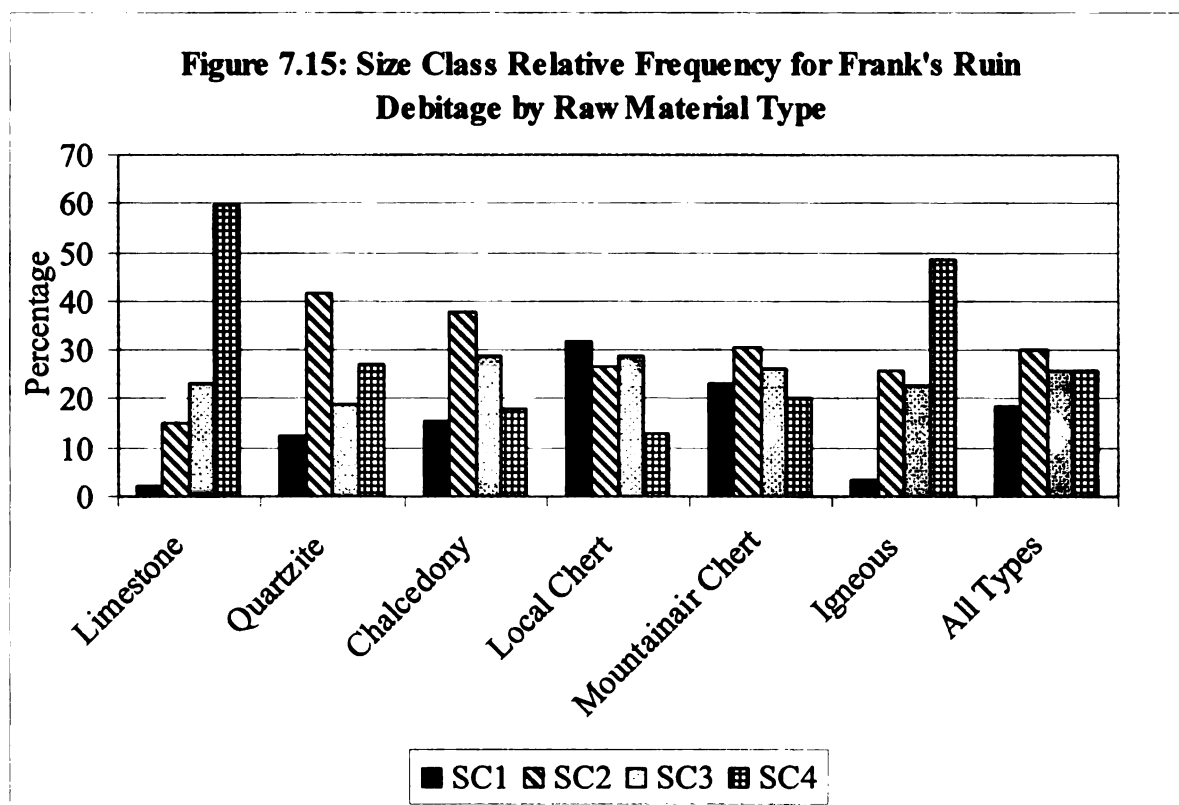
Table 7.21 presents the chi-square comparison of the cortex cover classes among the raw material proximity types. This chi-square test indicates that there is not a significant difference among the distributions ($\chi^2 = 8.692$, $\alpha = 0.05$, $df = 6$, critical value = 12.592).

Frank's Ruin Debitage: Site Size Class

Tables 7.22 and 7.23 display the frequency of the size classes for the debitage from the entire site by raw material type and raw material proximity type, respectively. Figures 7.15 and 7.16 illustrate the relative frequency of the size classes by raw material

Table 7.22: Frequency of Size Classes by Raw Material Type for Frank's Ruin Debitage Note: Mtn. Chert = Mountainair Chert, Chal. = Chalcedony									
	Limestone	Quartzite	Chal.	Local Chert	Mtn. Chert	Igneous	Obsidian	Other	All Types
SC1	2	6	20	32	72	1	0	0	133
SC2	14	20	49	27	95	8	1	1	215
SC3	22	9	37	29	81	7	0	0	185
SC4	56	13	23	13	62	15	0	1	183
Sum	94	48	129	101	310	31	1	2	716

Table 7.23: Frequency of Size Classes by Raw Material Proximity Type for Frank's Ruin Debitage				
	Local	Near-Local	Non-Local	All Types
SC1	60	72	1	133
SC2	110	95	9	214
SC3	97	81	7	185
SC4	105	62	15	182
Sum	372	310	32	714



type and raw material proximity type. Figure 7.15 has a fairly diverse array of distributions. Limestone and igneous both have relatively high frequencies of SC4 debitage, which could indicate that earlier stages of reduction were more common for these raw material types and/or the package size for these types is significantly larger than the other types. It has already been established that the package size for limestone is much larger than the rest of the types, likely contributing to its seemingly anomalous distribution. The average package size for igneous is unknown, making it difficult to distinguish between the affects of large package size and early stage reduction. The rest of the raw material types (quartzite, chalcedony, local chert, and Mountainair Chert) all have roughly similar distributions with the majority of the assemblages comprised of smaller flakes (SC1 and SC2), with the larger two flake classes still constituting a significant proportion of the total (ranging from roughly 35%-45%). This pattern

The lack of information on the igneous average package size makes this statement difficult to substantiate.

Table 7.24: Chi-Square Comparison of the Size Classes by Raw Material Proximity Type for Frank's Ruin Debitage ($\chi^2 = 19.707$, $\alpha = 0.05$, $df = 6$, critical value = 12.592)			
	Local	Near-Local	Non-Local
SC1	60(69.2)	72(57.7)	1(5.9)
SC2	110(111.5)	95(92.9)	9(9.5)
SC3	97(96.39)	81(80.3)	7(8.2)
SC4	105(94.8)	62(79.0)	15(8.1)

Table 7.25: Chi-Square Comparison of the Size Classes by Raw Material Proximity Type for Frank's Ruin Debitage ($\chi^2 = 9.14$, $\alpha = 0.05$, $df = 3$, critical value = 7.815)			
	Local	Near-Local	Non-Local
SC1	60(72)	72(60)	NA
SC2	110(112)	95(93.2)	NA
SC3	97(97.1)	81(80.9)	NA
SC4	105(91.1)	62(75.9)	NA

Table 7.24 is the chi-square comparison of the size class data among the raw material proximity types at the site. This chi-square test indicates that there is a significant difference among the size class distributions ($\chi^2 = 19.707$, $\alpha = 0.05$, $df = 6$, critical value = 12.592). Based on the differences between the observed and expected chi-square values and a visual inspection of Figure 7.16 it is apparent that the anomalous non-local distribution is largely responsible for the significance of this test. It is interesting that there is a significant difference for the site-wide size class chi-square test and not the site-wide cortex cover chi-square tests. Clearly there are factors other than solely reduction sequence that structure the composition of the size class and cortex cover variables. As already mentioned these "outside" factors include package size and the amount of initial nodule cortex cover.

The lack of information on the igneous average package size makes this statement difficult to substantiate.

Table 7.24: Chi-Square Comparison of the Size Classes by Raw Material Proximity Type for Frank's Ruin Debitage ($\chi^2 = 19.707$, $\alpha = 0.05$, $df = 6$, critical value = 12.592)			
	Local	Near-Local	Non-Local
SC1	60(69.2)	72(57.7)	1(5.9)
SC2	110(111.5)	95(92.9)	9(9.5)
SC3	97(96.39)	81(80.3)	7(8.2)
SC4	105(94.8)	62(79.0)	15(8.1)

Table 7.25: Chi-Square Comparison of the Size Classes by Raw Material Proximity Type for Frank's Ruin Debitage ($\chi^2 = 9.14$, $\alpha = 0.05$, $df = 3$, critical value = 7.815)			
	Local	Near-Local	Non-Local
SC1	60(72)	72(60)	NA
SC2	110(112)	95(93.2)	NA
SC3	97(97.1)	81(80.9)	NA
SC4	105(91.1)	62(75.9)	NA

Table 7.24 is the chi-square comparison of the size class data among the raw material proximity types at the site. This chi-square test indicates that there is a significant difference among the size class distributions ($\chi^2 = 19.707$, $\alpha = 0.05$, $df = 6$, critical value = 12.592). Based on the differences between the observed and expected chi-square values and a visual inspection of Figure 7.16 it is apparent that the anomalous non-local distribution is largely responsible for the significance of this test. It is interesting that there is a significant difference for the site-wide size class chi-square test and not the site-wide cortex cover chi-square tests. Clearly there are factors other than solely reduction sequence that structure the composition of the size class and cortex cover variables. As already mentioned these “outside” factors include package size and the amount of initial nodule cortex cover.

When the non-local category is removed from consideration (see Table 7.25), there still is a significant difference between the local and near-local size class distributions ($\chi^2 = 9.14$, $\alpha = 0.05$, $df = 3$, critical value 7.815). The differences between these two distributions are not totally unexpected from an organization of lithic technology stand point. The higher proportion of large flakes (especially SC4) for the local raw materials indicate an early mode of reduction, which one would expect for raw material types that can be found in the immediate vicinity of the site. The high frequency of smaller flakes (especially SC1) for the near-local materials also makes intuitive sense since raw nodules would not be available near the site, and the near-local materials that did make it to Frank's Ruin had likely already seen some reduction. It is interesting that none of the chi-square tests conducted within the depositional contexts were significant for the size class data, but site-wide there were differences detected. Behaviorally this suggests that the reduction modes within the contexts were generally similar, but at a coarser resolution differences in raw material use are evident.

Frank's Ruin Debitage: Intra-Site Comparison among Depositional Contexts

A series of chi-square test were used to compare the distributions of the cortex cover and size class variables across the depositional contexts at the site within the same raw material proximity types. A comparison of, for example, the cortex cover distributions of local raw materials across the room, plaza and midden contexts, informs how the raw material was used and deposited spatially at the pueblo. Since the count data used in all of these chi-square tests are available in the context specific descriptions, they are not duplicated here. Instead, Table 7.26 is used to summarize the results of all six tests. Two of the tests, non-local cortex cover and non-local size class, were not valid

because of small sample size. None of the calculated chi-square values for the cortex cover tests were above the critical value of 12.592 ($\alpha = 0.05$ $df = 6$). This indicates that depositional context was not a significant factor in structuring the cortex cover of local and near-local debitage.

Table 7.26: Summary of the Chi-Square Comparisons of the Raw Material Proximity Types across each of the Depositional Contexts at Frank's Ruin				
Raw Material (Test)	χ^2	χ^2 Critical Value	Significance	Note
Local (CC)	8.67	12.592	No	
Near-Local (CC)	4.23	12.592	No	
Non-Local (CC)	7.25	12.592	No	Not Valid
Local (SC)	16.30	12.592	Yes	
Near-Local (SC)	17.10	12.592	Yes	
Non-Local (SC)	7.07	12.592	No	Not Valid

In contrast, the chi-square comparison of the size class data for both the local ($\chi^2 = 16.3$, $\alpha = 0.05$, $df = 6$, critical value 12.592) and near-local materials ($\chi^2 = 17.1$, $\alpha = 0.05$, $df = 6$, critical value 12.592) indicate that there is a significant difference among the depositional contexts. Figures 7.4, 7.8, and 7.12 display the relative frequency of the size classes for the local raw material type in the room, plaza, and midden context, respectively. The relatively high proportion of SC4 flakes and the paucity of SC1 debitage in the room context is a notable feature of Figure 7.4. The size class distributions for the plaza (see Figure 7.8) and midden (see Figure 7.12) contexts are roughly similar to each other, and noticeably different than the anomalous room distribution. Based on the high frequency of large flakes for the room context relative to the other contexts, it appears that early stages of reduction were more common in this context.

The calculated chi-square value of 17.10 for the near-local materials also exceeds the critical value of 12.592. Much like the local raw material results discussed above,

one of the major differences among the contexts is the relatively low proportion of SC1 flakes and the relatively high proportion of SC3 and SC4 debitage for the room context (see Figures 7.4, 7.8, and 7.12). The plaza (see Figure 7.8) and midden distributions (see Figure 7.12) resemble each other more than they do the room context (Figure 7.4), but there remain some important differences such as the high frequency of SC3 debitage in the midden. Based on this chi-square test and the distributions in Figures 7.4, 7.8, and 7.12 it seems that early stages of reduction were typical of the room context and to a lesser extent the midden context. The relatively high proportion of smaller flakes for the plaza suggests that debitage from later stages of reduction were more commonly deposited in this context.

The uniqueness of the room contexts for both the local and near-local size class distributions is an interesting parallel between the two raw material proximity types. The size class data for both types indicates that early stages of reduction were more common in the rooms. One tentative explanation for this pattern is that it reflects staged reduction at the pueblo, with initial/early stage reduction occurring in the room context.

Frank's Ruin Cores: Room Context

Table 7.27 presents the core curation level data for the rooms at Frank's Ruin by raw material type. Limestone and Mountainair Chert, which were the two most frequently used raw materials for cores (N=7 and N=16, respectively), were commonly utilized to make CL2 cores. Nearly 86% of the limestone cores and 75% of the Mountainair Chert cores were CL2 (i.e. multidirectional and unidirectional cores). Local chert, the next most common raw material type for cores (N=4), was used exclusively to make CL1 cores (i.e. bipolar cores). All of the other raw material types used to make

cores have a single example, so there are no trends to distinguish for these types. In the raw material proximity type data displayed in Table 7.28 the local raw material type is roughly split between CL1 and CL2 cores, while the near local materials are predominately CL2 (75%). The single, non-local core was CL2.

Table 7.27: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Type for Frank's Ruin Room Cores

Note: Mtn. Chert = Mountainair Chert, Chal. = Chalcedony

	Limestone	Quartzite	Chal.	Local Chert	Mtn. Chert	Igneous	Obsidian	All Types
CL1	1	0	1	4	4	0	0	10
CL2	6	1	0	0	12	1	0	20
sum	7	1	1	4	16	1	0	30

Table 7.28: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Proximity Type for Frank's Ruin Room Cores

	Local	Near-Local	Non-Local	All Types
CL1	6	4	0	10
CL2	7	12	1	20
Sum	13	16	1	30

Table 7.29: Chi-Square Comparison of the Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Proximity Type for Frank's Ruin Room Cores

($\chi^2 = 1.42$, $\alpha = 0.05$, $df = 1$, critical value = 3.841)

	Local	Near-Local	Non-Local
CL1	6 (4.3)	4 (5.3)	NA
CL2	7 (8.6)	12 (10.6)	NA

Table 7.29 displays the chi-square comparison of the core curation levels by raw material proximity type for the room context. Non-local raw materials were excluded from the comparison because of small sample size ($N=1$). The chi-square test indicates that there is not a significant difference in core curation levels between the local and near-local stone types ($\chi^2 = 1.421$, $\alpha = 0.05$, $df = 1$, critical value = 3.841).

Frank's Ruin Cores: Plaza Context

Table 7.30 presents the core curation level data for the plaza context by raw material type. There were only a handful of cores (N= 6.4) recovered in the plaza context, making pattern detection at this level of resolution problematic. The only raw material type with more than trace core frequencies is local chert (N=4), with four CL1 cores. When the core data are aggregated into raw material proximity types (see Table 7.31), we see that roughly 90% of the local cores are CL1 and the near-local cores are equally split between CL1 and CL2. Due to the overall small sample size in this context, there are very few meaningful statements that can be made about the data. No chi-square tests of independence were used to compare the data in this context.

Table 7.30: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Type for Frank's Ruin Plaza Cores

Note: Mtn. Chert = Mountainair Chert, Chal. = Chalcedony

	Limestone	Quartzite	Chal.	Local Chert	Mtn. Chert	Igneous	Obsidian	All Types
CL1	0	0	0	4	1	0	0	5
CL2	0	0.4	0	0	1	0	0	1.4
sum	0	0.4	0	4	2	0	0	6.4

Table 7.31: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Proximity Type for Frank's Ruin Plaza Cores

	Local	Near-Local	Non-Local	All Types
CL1	4	1	0	5
CL2	0.4	1	0	1.4
Sum	4.4	2	0	6.4

Frank's Ruin Cores: Midden Context

Table 7.32 presents the core curation level data by raw material type for the midden context. Both of the chalcedony cores are CL1, the two Mountainair Chert cores are CL2, and the local chert type has 50% CL1 and 50% CL2 cores. When the data are

aggregated into the raw material proximity types (see Table 7.33), it is apparent that there was a difference in how the local and near-local types were utilized. Curation level 1 cores comprise 75% of the local cores, while there are no examples of CL1 cores from the two cores made of near-local materials. Beyond listing this narrative description, there is not an abundance of information available to substantiate this initial level of analysis using a chi-square test because of the small sample size in this context (N=6). Therefore the apparent difference between the local and near-local types may or may not be significant.

Table 7.32: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Type for Frank's Ruin Midden Cores

Note: Mtn. Chert = Mountainair Chert, Chal. = Chalcedony

	Limestone	Quartzite	Chal.	Local Chert	Mtn. Chert	Igneous	Obsidian	All Types
CL1	0	0	2	1	0	0	0	3
CL2	0	0	0	1	2	0	0	3
Sum	0	0	2	2	2	0	0	6

Table 7.33: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Proximity Type for Frank's Ruin Midden Cores

	Local	Near-Local	Non-Local	All Types
CL1	3	0	0	3
CL2	1	2	0	3
Sum	4	2	0	6

Frank's Ruin Cores: Site

Table 7.34 displays the curation level core data by raw material type for the entire site. Almost all of the cores for both limestone (90%) and Mountainair Chert (75%) are CL2. Quartzite and igneous, which both have small sample sizes (N=1.4 and N=1, respectively) are all CL2 cores. The opposite is true for chalcedony (N=3, 100%) and local chert (N=10, 90%), where the majority of the cores are CL1. Table 7.35 shows the

site-wide core data aggregated by raw material proximity type. For the local type

(N=21.4) 39% of the cores are CL2, while for the near-local type (N=20) 75% are CL2.

Table 7.34: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Type for Frank's Ruin Cores								
Note: Mtn. Chert = Mountainair Chert, Chal. = Chalcedony								
	Limestone	Quartzite	Chal.	Local Chert	Mtn Chert	Igneous	Obsidian	All Types
CL1	1	0	3	9	5	0	0	18
CL2	6	1.4	0	1	15	1	0	24.4
Sum	7	1.4	3	10	20	1	0	42.4

Table 7.35: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Proximity Type for Frank's Ruin Cores				
	Local	Near-Local	Non-Local	All Types
CL1	13	5	0	18
CL2	8.4	15	1	24.4
Sum	21.4	20	1	42.4

Table 7.36 presents the chi-square comparison of the core curation levels among the raw material proximity types at the site. The non-local type was not considered because of small sample size (N=1). The chi-square test indicates that there is a significant difference between the local and near-local cores ($\chi^2 = 4.972$, $\alpha = 0.05$, $df = 1$, critical value = 3.841). It is difficult to parse out interpretive meaning from this finding since the behavioral difference between the curation levels is minimal. That is, there is little difference between the lightly standardized CL2 cores (i.e. multidirectional and unidirectional) and the non-standardized CL1 cores (i.e. bipolar). Since bipolar reduction is often associated with the final phase of reduction before a core is considered “exhausted”, this trend could be measuring the intensity of core use at the site, with local raw materials being reduced to exhaustion while near-local raw materials were discarded more readily. Alternatively, this trend could be measuring the preferred method of flake

blank production for the two raw material types. Regardless, the raw material-specific variability discerned in the Frank's Ruin core assemblage is a useful benchmark for the interpretation of the inter-site core data.

Table 7.36: Chi-Square Comparison of the Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Proximity Type for Frank's Ruin Cores ($\chi^2 = 4.972$, $\alpha = 0.05$, $df = 1$, critical value = 3.841)			
	Local	Near-Local	Non-Local
CL1	13 (9.4)	5 (8.5)	NA
CL2	9 (12.5)	15 (11.4)	NA

Due to the generally small sample size across the raw material proximity types a chi-square test comparing the use of the same raw materials across the depositional contexts would not be meaningful. Referencing each of the raw material proximity types in Tables 7.28, 7.31, 7.33, and 7.35 indicates that there was not a prominent spatial component to how each type was used. Naturally, the inability to perform a chi-square test prevents the possibility of statistically supporting this statement.

Frank's Ruin Tools: Room Context

Tables 7.37 and 7.38 display the completeness factor corrected frequencies of the curation levels by raw material type and raw material proximity type for the tools from room context, respectively. Figures 7.17 and 7.18 illustrate the completeness factor corrected relative frequency of the tool curation levels within each of the raw material types and raw material proximity types, respectively. All of the raw material types in Figure 7.17 that have reasonably large samples (i.e. chalcedony, local chert, Mountainair Chert, and igneous) have the full range of curation levels. This indicates that there were no raw material-specific activity/deposition behaviors that favored any of the curation

Table 7.37: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Type for Frank's Ruin Room Tools

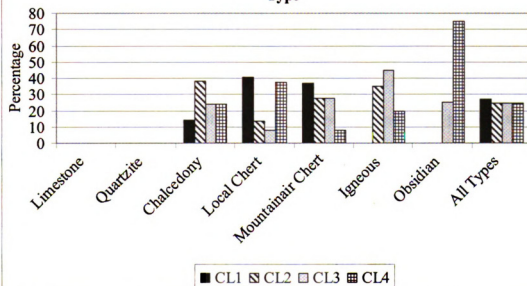
Note: Mtn. Chert = Mountainair Chert, Chal. = Chalcedony

	Limestone	Quartzite	Chal.	Local Chert	Mtn. Chert	Igneous	Obsidian	All Types
CL1	0.0	0.0	0.6	3	4.6	0	0	8.2
CL2	0.0	0.0	1.6	1	3.4	1.4	0	7.4
CL3	0.0	0.0	1	0.6	3.4	1.8	0.6	7.4
CL4	0.0	0.0	1	2.8	1	0.8	1.8	7.4
Sum	0.0	0.0	4.2	7.4	12.4	4	2.4	30.4

Table 7.38: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Proximity Type for Frank's Ruin Room Tools

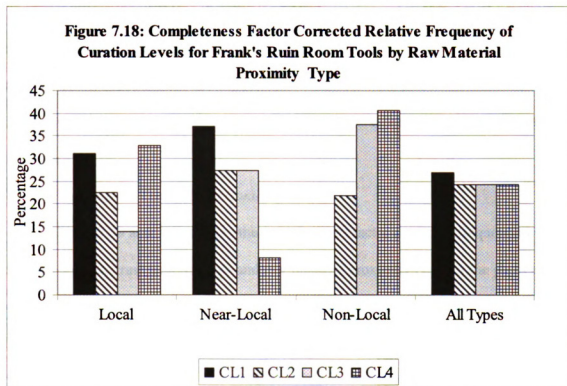
	Local	Near-Local	Non-Local	All Types
CL1	3.6	4.6	0.0	8.2
CL2	2.6	3.4	1.4	7.4
CL3	1.6	3.4	2.4	7.4
CL4	3.8	1.0	2.6	7.4
Sum	11.6	12.4	6.4	30.4

Figure 7.17: Completeness Factor Corrected Relative Frequency of Curation Levels for Frank's Ruin Room Tools by Raw Material Type



levels for the room context. Put another way, the common raw material types were utilized for a range of functions that required different levels of tool curation. All of the

obsidian tools from the room context are either CL3 or CL4, indicating that there may have been more of a specialized use/deposition of this raw material type. Notably, none of the common raw material types in this context have similar “shapes” to their distribution indicating that, despite the trend of generalized stone use, there were differences between how each raw material type was utilized.



The raw material proximity type data displayed in Figure 7.18 provides a more condensed and interesting impression of the room tools. Local and near-local raw materials both have high frequencies of the lightly curated CL1 and CL2 tools. The primary difference between the local and near-local distributions is the high relative proportion of the heavily curated CL4 tools for the local raw materials, suggesting a behavioral difference in use/deposition. The non-local tools are primarily CL3 and CL4

with no examples of the lightly curated CL1 tools, which is a deviation from the trend for the other raw material proximity types in this context.

Although there appears to be some interesting patterns in the raw material proximity type data, the small sample size presents an obstacle for a statistically valid assessment using a chi-square test. When all of the raw material types are combined for the room context (see “all types” in Figure 7.18), there is an almost identical proportional importance for each of the curation levels. Given the other trends already discussed, this suggests that a wide range of use/depositional behaviors were present in this context, but there was not a clear dominance of any set(s) of behaviors that require a specific level of tool curation.

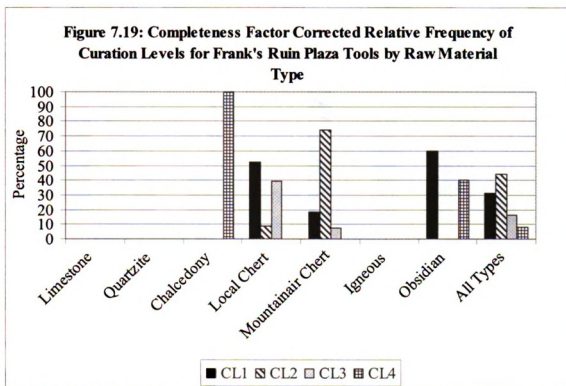
Frank's Ruin Tools: Plaza Context

Tables 7.39 and 7.40 display the completeness factor corrected frequencies of the curation levels by raw material type and raw material proximity type for the plaza tools, respectively. Figures 7.19 and 7.20 display the completeness factor corrected relative frequencies of the tool curation levels for the raw material types and raw material proximity types, respectively. The small sample size from this context permits

Table 7.39: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Type for Frank's Ruin Plaza Tools Note: Mtn. Chert = Mountainair Chert, Chal. = Chalcedony								
	Limestone	Quartzite	Chal.	Local Chert	Mtn. Chert	Igneous	Obsidian	All Types
CL1	0.0	0.0	0	2.4	1.5	0.0	0.6	4.5
CL2	0.0	0.0	0	0.4	6	0.0	0	6.4
CL3	0.0	0.0	0	1.8	0.6	0.0	0	2.4
CL4	0.0	0.0	0.8	0	0	0.0	0.4	1.2
Sum	0.0	0.0	0.8	4.6	8.1	0.0	1	14.5

Table 7.40: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Proximity Type for Frank's Ruin Plaza Tools				
	Local	Near-Local	Non-Local	All Types
CL1	2.4	1.5	0.6	4.5
CL2	0.4	6.0	0.0	6.4
CL3	1.8	0.6	0.0	2.4
CL4	0.8	0.0	0.4	1.2
Sum	5.4	8.1	1.0	14.5

more of a description than an analysis of any patterns in the data. Figure 7.19 shows that Mountainair Chert, which is the most common plaza tool stone, is predominately CL2 tools (over 70%), with lesser amounts of the CL1 and CL3 tools. Chalcedony, which has an exceedingly small sample size ($N=0.8$), was used exclusively for the heavily curated

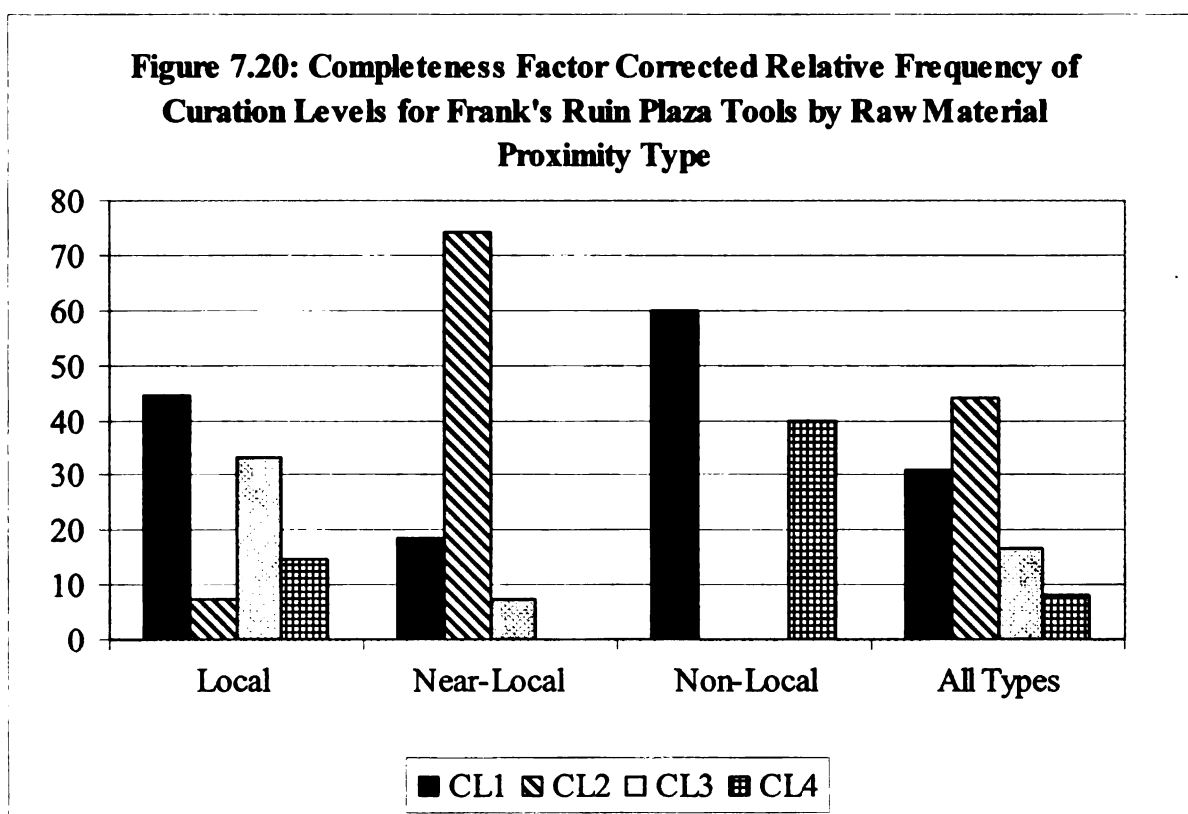


CL4 tools. The local chert tools, which are the second most common raw material type ($N=4.6$), are primarily CL1 tools (roughly 50%), although there is a significant

proportion of CL3 tools (roughly 40%) with CL2 tools making up the remainder.

Obsidian tools (N=1), are all CL1 (60%) or CL2 tools (40%).

The more generalized data in Figure 7.20 indicate that the full range of curation classes were recorded for the local materials from the plaza context, although CL1 and CL3 tools were by far the most common. The majority of the near-local tools recovered in the plaza context were CL1 and CL2, indicating a more specialized use/deposition of this raw material. The non-local type, which had the smallest sample size (N=1), is



roughly divided between CL1 (60%) and CL4 tools (40%). The combined “all types” distribution in Figure 7.20 indicates that the minimally curated CL1 and CL2 tools were the dominate tool types deposited in this context, followed by CL1. This overall trend is suggestive of a more specific use of the plaza for tasks that involved minimally curated tools, or at least the deposition of minimally curated tools.

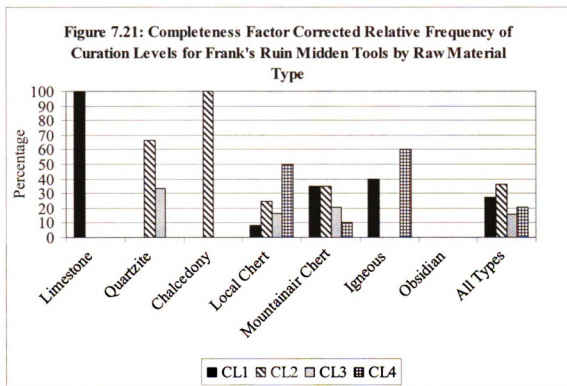
Frank's Ruin Tools: Midden Context

Tables 7.41 and 7.42 display the completeness factor corrected frequencies of the curation levels by raw material type and raw material proximity type for the tools from midden context, respectively. Figures 7.21 and 7.22 present the completeness factor corrected relative frequency of the tool curation levels within the raw material types and raw material proximity types, respectively. Like the other contexts at Frank's Ruin, there was not a high frequency of tools recovered in the midden, which prevents this discussion of the midden tools from being more than a description. Limestone, quartzite, chalcedony, and igneous all have a frequency of two or less. All of the limestone tools (N=1) were CL1, while all of the chalcedony tools (N=2) were CL2. The quartzite tools (N=0.6) were primarily CL2, with 33% CL3 tools. The igneous tools (N=1) were divided between CL1 (40%) and CL4 tools (60%). Local chert, which was the second most common raw material type in the midden (N=4.8), has tools from the full range of curation levels. For local chert, CL4 tools were the most common (50%), followed by CL2 tools (25%). Mountainair Chert, the most common raw material type (N=9.8), also had the full range of curation levels represented with CL1 (35%) and CL2 (35%) tools constituting the majority of the tools.

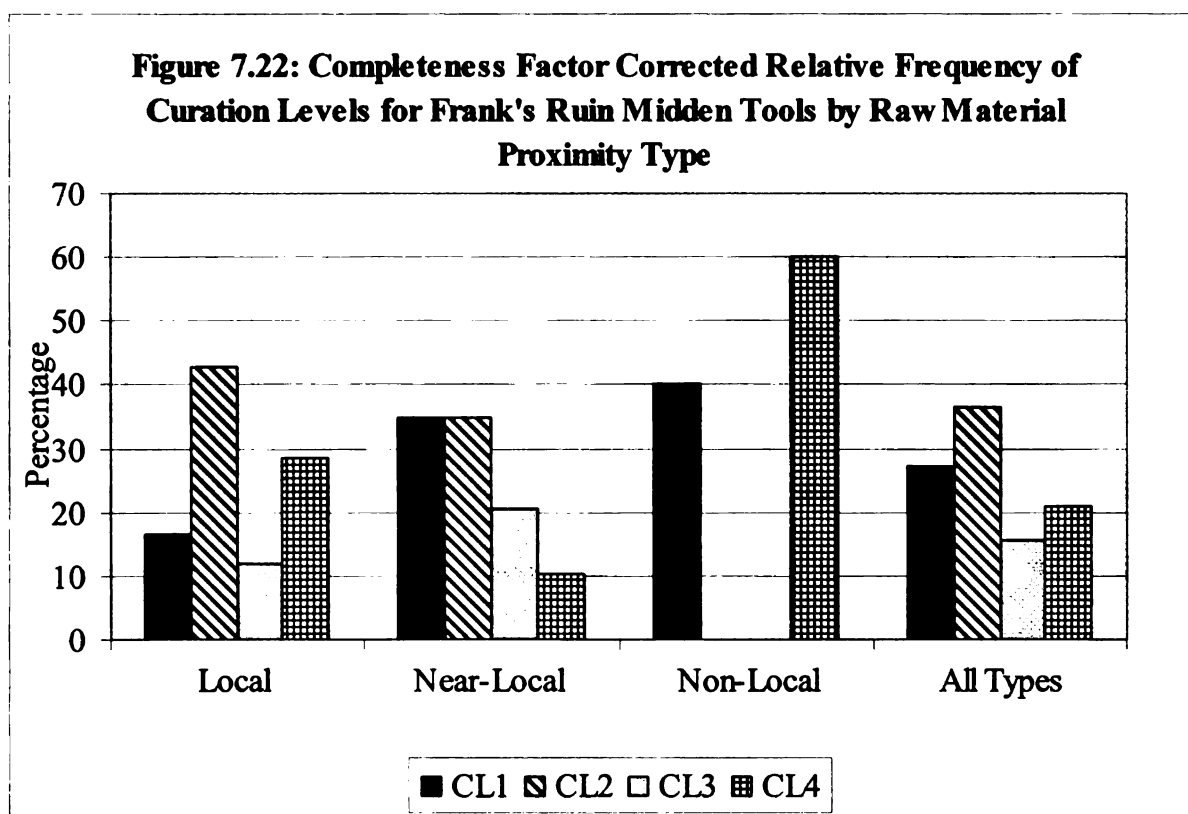
Table 7.41: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Type for Frank's Ruin Midden Tools Note: Mtn. Chert = Mountainair Chert, Chal. = Chalcedony								
	Limestone	Quartzite	Chal.	Local Chert	Mtn. Chert	Igneous	Obsidian	All Types
CL1	1.0	0	0	0.4	3.4	0.4	0.0	5.2
CL2	0.0	0.4	2	1.2	3.4	0	0.0	7.0
CL3	0.0	0.2	0	0.8	2	0	0.0	3.0
CL4	0.0	0	0	2.4	1	0.6	0.0	4.0
Sum	1.0	0.6	2	4.8	9.8	1	0.0	19.2

Table 7.42: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Proximity Type for Frank's Ruin Midden Tools

	Local	Near-Local	Non-Local	All Types
CL1	1.4	3.4	0.4	5.2
CL2	3.6	3.4	0.0	7.0
CL3	1.0	2.0	0.0	3.0
CL4	2.4	1.0	0.6	4.0
Sum	8.4	9.8	1.0	19.2



The raw material proximity type data displayed in Figure 7.22 indicate that the local and near local raw material types have the full range of curation levels represented. Most of the local (roughly 60%) and near-local (roughly 65%) tools are lightly curated, although there is also a significant proportion of CL4 tools (28%) made of local raw materials. The non-local raw materials (N=1) have 40% CL1 and 60% CL4 tools. As a whole, most of the tools found in the midden context at Frank's Ruin are CL2 (36%) and CL1 (27%). If the midden context provides a good indicator of the overall tool use at the



site, this would indicate that “expedient” tools (i.e. CL1 and CL2) were the most common tool types. The more heavily curated CL3 and CL4 tools also comprise roughly 35% of the total from this context, indicating that these tools were also an important component of the assemblage.

Frank's Ruin Tools: Site

Tables 7.43 and 7.44 present the completeness factor corrected frequencies of the curation levels by raw material type and raw material proximity type for all of the tools at Frank's Ruin, respectively. Figures 7.23 and 7.24 display the completeness factor corrected relative frequencies of the tool curation levels within each of the raw material types and raw material proximity types, respectively. Referencing the “All Types” column in Table 7.43 indicates that expedient tools (CL1 and CL2) are the most common at the site, which conforms to the expectation for a sedentary, agriculturalist society

(Parry and Kelly 1987; Young and Harry 1989). The four most common raw material types in Figure 7.23 (i.e. Mountainair Chert, local chert, chalcedony, and igneous,) all have tools from the full range of curation levels. Chalcedony (60%) and Mountainair Chert (70%) are principally comprised of lightly curated tools (CL1 and CL2). The lightly curated tool types are proportionally less important in the local chert (50%) and igneous (35%) tool assemblages. The lack of the predominance of any single curation level for these raw material types suggests that they saw a wide range of uses at the site. This is not overly surprising given their apparently frequent use at the site. All of the limestone tools (N=1) were CL1, indicating that this poor quality raw material type was employed to make only the most expedient of tools. The high quality obsidian, on the other hand, was predominately used to make the highly curated CL3 and CL4 tools. The infrequently used quartzite (N=0.6) was 65% CL2 tools and 35% CL3.

Table 7.43: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Type for Frank's Ruin Tools

Note: Mtn. Chert = Mountainair Chert, Chal. = Chalcedony

	Limestone	Quartzite	Chal.	Local Chert	Mtn. Chert	Igneous	Obsidian	All Types
CL1	1.0	0	0.6	5.8	9.5	0.4	0.6	17.9
CL2	0.0	0.4	3.6	2.6	12.8	1.4	0	20.8
CL3	0.0	0.2	1	3.2	6	1.8	0.6	12.8
CL4	0.0	0	1.8	5.2	2	1.4	2.2	12.6
Sum	1.0	0.6	7	16.8	30.3	5	3.4	64.1

Table 7.44: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Proximity Type for Frank's Ruin Tools

	Local	Near-Local	Non-Local	All Types
CL1	7.4	9.5	1.0	17.9
CL2	6.6	12.8	1.4	20.8
CL3	4.4	6.0	2.4	12.8
CL4	7.0	2.0	3.6	12.6
Sum	25.4	30.3	8.4	64.1

Figure 7.23: Completeness Factor Corrected Relative Frequency of Curation Levels for Frank's Ruin Tools by Raw Material Type

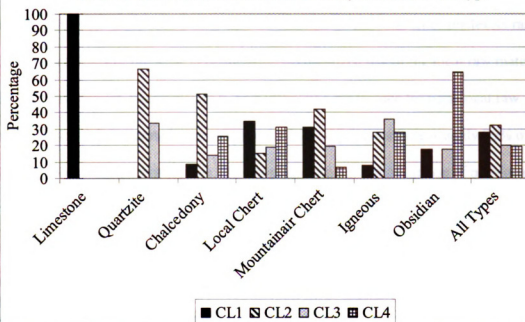
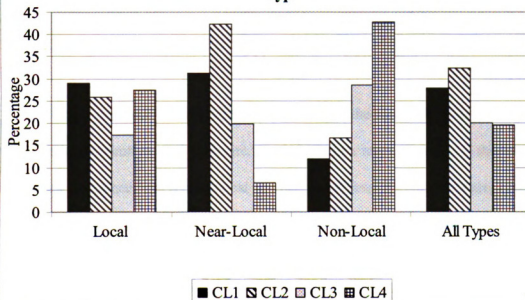


Figure 7.24: Completeness Factor Corrected Relative Frequency of Curation Levels for Frank's Ruin Tools by Raw Material Proximity Type



The distributions displayed in Figure 7.24 indicate that there may have been a relationship between raw material proximity type and tool utilization at the site. The local type has the most even distribution of curation levels, with all of the levels ranging from 17% to 28% of the total. This indicates generalized use of the local raw materials at the site. In contrast, there appears to be a utilization preference for near-local raw materials for lightly curated tools (CL1 and CL2), which constitute roughly 75% of the total near-local tools from the site. The opposite can be said of the use of non-local raw materials, with roughly 75% of the total comprised of the heavily curated CL3 and CL4 tools. It is unclear if the differences among the use of raw material proximity types at the site reflects the affects of source distance from site, the qualities of the stone (hardness, predictable fracture), or a combination of both.

Table 7.45: Chi-Square Comparison of the Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Proximity Type for Frank's Ruin Tools ($\chi^2 = 4.64$, $\alpha = 0.05$, $df = 3$, critical value = 7.815)			
	Local	Near-Local	Non-Local
CL1	7.4 (8.3)	9.5 (9.6)	NA
CL2	6.6 (9.3)	12.8 (10.7)	NA
CL3	4.4 (5.1)	6.0 (5.8)	NA
CL4	7.0 (4.1)	2.0 (4.8)	NA

Table 7.45 shows the chi-square comparison of the tool curation levels among the raw material proximity types at the site. This chi-square test indicates that there is not a significant difference between the local and near-local raw material proximity types ($\chi^2 = 4.64$, $\alpha = 0.05$, $df = 3$, critical value = 7.815), indicating that the patterns in raw material use discussed above are not overly pronounced.

Frank's Ruin Discussion

Beyond the depositional context and raw material type specific observations discussed in this chapter, there are some aspects of the Frank's Ruin chipped stone assemblage that are worth noting. Across more than one artifact type there were a number of instances of statistically significant differences in artifact variable composition among the depositional contexts and the raw material proximity types within the depositional contexts. These results indicate that there were important differences in the tool curation behaviors at Frank's Ruin related to the two analytical dimensions used in this study. Another notable feature was the lack of interpretive correspondence between the two debitage variables in a number of instances, which, as already mentioned, is likely due to factors that include differences in average package size, variability in initial nodule cortex cover, and assemblage mixing. This lack of correspondence in the debitage variables is an important consideration when multiple artifact types (i.e. debitage, cores, and tools) are used to evaluate broad organizational principles such as tool curation. As was noted in the introduction, the real value of this discussion of the intra-site lithic organization of Frank's Ruins is that it provides baseline data concerning the level of variability within the site and it also provides for multiple points of comparison between Frank's Ruin and Pueblo de la Mesa. In the next chapter, the intra-site analyses of Pueblo de la Mesa are discussed, which is followed (in Chapter 9) by the inter-site comparison of the organization of lithic technology.

Chapter 8: Pueblo de la Mesa Intra-Site Analyses

Introduction

In this chapter the intra-site organization of lithic technology at Pueblo de la Mesa is evaluated across the depositional contexts and raw material types using the cortex cover and mass analysis (i.e. size class) variables for the debitage, and the curation level variable for the cores and tools. The objectives and methods are the same for these analyses as they were for the Frank's Ruin analyses. The reader is directed to the introduction of Chapter 7 for a full discussion of why and how the intra-site analyses were conducted.

Pueblo de la Mesa Debitage: Room Cortex Cover

Tables 8.1 and 8.2 show the frequency of cortex cover classes for the debitage from room context by raw material type and raw material proximity type, respectively. Figures 8.1 and 8.2 illustrate the relative frequency of the cortex cover classes by raw material type and raw material proximity type, respectively. In general, many of the cortex cover distributions (quartzite, chalcedony, local chert, Mountainair Chert, igneous, and obsidian) in Figure 8.1 follow a similar trend, with the majority of the flakes belonging to either CC1 or CC2, with only a fraction of flakes representing the CC3 and CC4 categories. This pattern indicates that later stages of reduction were the dominate mode of reduction for these raw material types. The higher proportion of igneous CL3 debitage suggests that earlier stages of reduction could have been relatively more common for this raw material type. Limestone has the most divergent distribution, with over 15% of the total assemblage represented by the completely cortical CL4 debitage and over 65% of the flakes with some dorsal cortex cover. The high degree of cortex

cover for limestone indicates that early stages of reduction were common for this raw material type.

Table 8.1: Frequency of Cortex Cover Classes by Raw Material Type for Pueblo de la Mesa Room Debitage

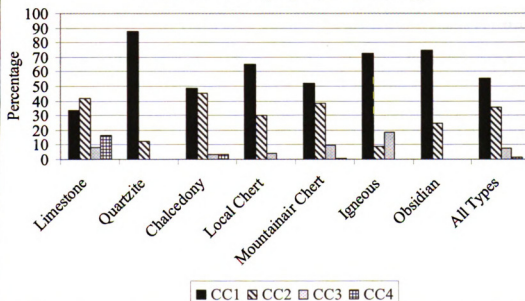
Note: Mtn. Chert = Mountainair Chert, Chal. = Chalcedony

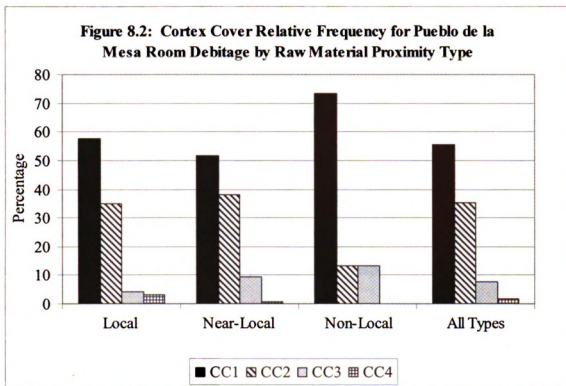
	Limestone	Quartzite	Chal.	Local Chert	Mtn. Chert	Igneous	Obsidian	Other	All Types
CC1	4	7	15	30	72	8	3	1	140
CC2	5	1	14	14	53	1	1	0	89
CC3	1	0	1	2	13	2	0	0	19
CC4	2	0	1	0	1	0	0	0	4
Sum	12	8	31	46	139	11	4	1	252

Table 8.2: Frequency of Cortex Cover Classes by Raw Material Proximity Type for Pueblo de la Mesa Room Debitage

	Local	Near-Local	Non-Local	All Types
CC1	56	72	11	139
CC2	34	53	2	89
CC3	4	13	2	19
CC4	3	1	0	4
Sum	97	139	15	251

Figure 8.1: Cortex Cover Relative Frequency for Pueblo de la Mesa Room Debitage by Raw Material Type





When the data are grouped by raw material proximity type (see Figure 8.2), it is evident that local (N=97) and near-local (N=139) varieties have an almost identical distribution. The non-local distribution, which has a considerably smaller sample size (N=15), is generally similar to the other two types except for the lower frequency of CC2 debitage. All of these distributions indicate later stages of reduction for the raw material proximity types from room context, especially for non-local materials.

Table 8.3: Chi-Square Comparison of the Cortex Cover Classes by Raw Material Proximity Type for Pueblo de la Mesa Room Debitage ($\chi^2 = 4.58$, $\alpha = 0.05$, $df = 3$, critical value = 7.815)			
	Local	Near-Local	Non-Local
CC1	56 (52.6)	72 (75.3)	NA
CC2	34 (35.7)	53 (51.2)	NA
CC3	4 (6.9)	13 (10.0)	NA
CC4	3 (1.6)	1 (2.3)	NA

Table 8.3 displays the chi-square comparison of the cortex cover classes between the local and near-local stone types. The non-local type was not considered in the analysis because of small sample size (N=15). This chi-square test indicates that there is not a significant difference between the local and near-local raw material proximity types ($\chi^2 = 4.585$, $\alpha = 0.05$, $df = 3$, critical value = 7.815).

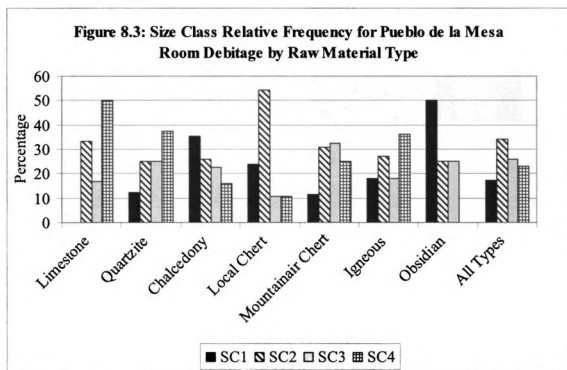
Pueblo de la Mesa Debitage: Room Size Class

Tables 8.4 and 8.5 present the frequency of the size classes for the room debitage by raw material type and raw material proximity type, respectively. Figures 8.3 and 8.4 illustrate the relative frequency of the size classes by raw material type and raw material proximity type, respectively. There is quite a diversity of distributions in Figure 8.3. The most common flake size for limestone, quartzite, and igneous is the large SC4 debitage. The average package size for limestone is much larger than the rest of the raw material types (see Chapter 4), so it is not surprising that most limestone flakes are also large. The

Table 8.4: Frequency of Size Classes by Raw Material Type for Pueblo de la Mesa Room Debitage									
Note: Mtn. Chert = Mountainair Chert, Chal. = Chalcedony									
	Limestone	Quartzite	Chal.	Local Chert	Mtn. Chert	Igneous	Obsidian	Other	All Types
SC1	0	1	11	11	16	2	2	0	43
SC2	4	2	8	25	43	3	1	0	86
SC3	2	2	7	5	45	2	1	1	65
SC4	6	3	5	5	35	4	0	0	58
Sum	12	8	31	46	139	11	4	1	252

Table 8.5: Frequency of Size Classes by Raw Material Proximity Type for Pueblo de la Mesa Room Debitage				
	Local	Near-Local	Non-Local	All Types
SC1	23	16	4	43
SC2	39	43	4	86
SC3	16	45	3	64
SC4	19	35	4	58
Sum	97	139	15	251

average package size for quartzite is closer to that of the rest of the raw material types, which suggests that the high frequency of large flakes in room context might be related to relatively more early stage reduction. Mountainair Chert also has a relatively high frequency of large flakes (SC3 and SC4), suggesting a significant early stage component to the reduction of this raw material. The chalcedony, local chert, and obsidian distributions are all dominated by smaller flakes (SC1 and SC2), indicating that later stages of reduction were more common for these raw materials.



The raw material proximity type distributions in Figure 8.4 are also quite variable. The local distribution is principally comprised of smaller flakes, with SC2 and SC1 (respectively) being the most common, indicating primarily later stages of reduction for these raw materials. The most common size class for the near-local raw materials is SC3, followed by SC2, with a relatively high proportion of SC4 debitage, indicating a mix of early and later stages of reduction for these raw materials. The non-local raw material

types have an almost even distribution of the four size classes, indicating a mix of early and late stages of reduction.

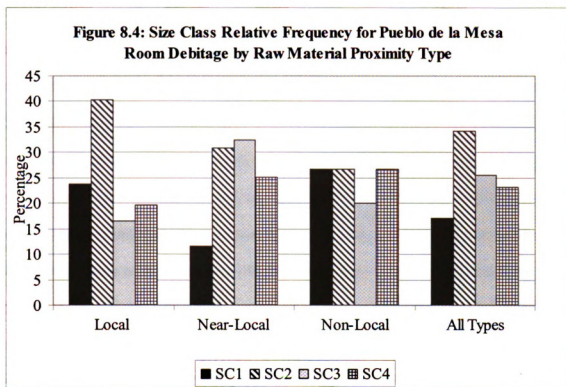


Table 8.6: Chi-Square Comparison of the Size Classes by Raw Material Proximity Type for Pueblo de la Mesa Room Debitage ($\chi^2 = 12.9$, $\alpha = 0.05$, $df = 3$, critical value = 7.815)			
	Local	Near-Local	Non-Local
SC1	23 (16)	16 (23)	NA
SC2	39 (33.7)	43 (48.3)	NA
SC3	16 (25.1)	45 (35.9)	NA
SC4	19 (22.2)	35 (31.8)	NA

Table 8.6 displays the chi-square comparison of the local and near-local size class distributions. The non-local type was not included due to low sample size ($N=14$). This chi square tests indicates that there is significant difference between the local and near-local size class data ($\chi^2 = 12.9$, $\alpha = 0.05$, $df = 3$, critical value = 7.815).

Pueblo de la Mesa Debitage: Room Summary

Much like several of the debitage analyses from Frank's Ruin, there was not a clear correspondence between the interpretation of the cortex cover and size class data for the Pueblo de la Mesa room debitage. The cortex cover data generally indicated later stages of reduction for many raw material types (chalcedony, local chert, Mountainair Chert, obsidian), while the size class analysis suggested an increased importance of early stage reduction. As already noted, this could be due to an imperfect relationship between how the two variables "respond" to different levels of reduction, as well as factors such as the amount of initial cortex cover and average package size for the raw materials. There was a better correspondence between the cortex cover and size class data for limestone and igneous, which both appeared to mostly consist of early stage debitage.

Pueblo de la Mesa Debitage: Plaza Cortex Cover

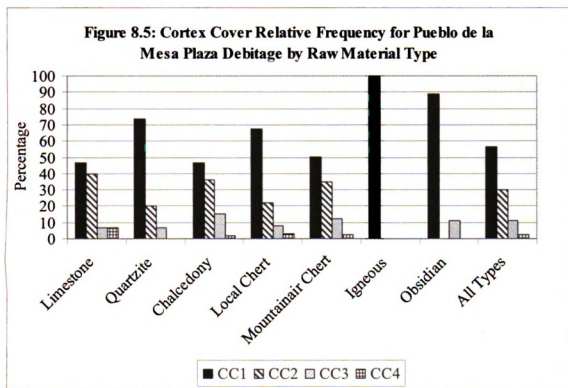
Tables 8.7 and 8.8 show the frequency of the cortex cover classes for the debitage from plaza context by raw material type and raw material proximity type, respectively. Figures 8.5 and 8.6 display the relative frequency of cortex cover classes by raw material type and raw material proximity type, respectively. In Figure 8.5, limestone, chalcedony, and Mountainair Chert all have similar cortex cover distributions. For all three types CC1 flakes are the most common, followed by a relatively high proportion of CC2

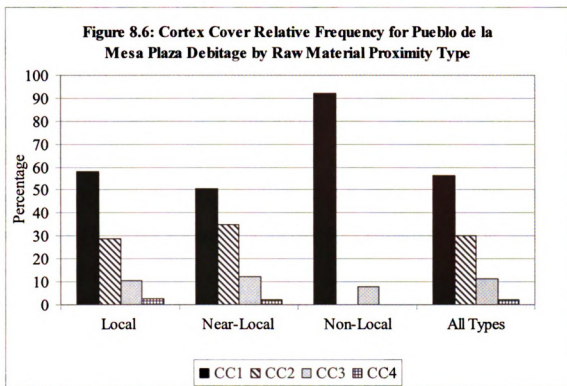
Table 8.7: Frequency of Cortex Cover Classes by Raw Material Type for Pueblo de la Mesa Plaza Debitage									
Note: Mtn. Chert = Mountainair Chert, Chal. = Chalcedony									
	Limestone	Quartzite	Chal.	Local Chert	Mtn. Chert	Igneous	Obsidian	Other	All Types
CC1	7	11	27	43	94	7	16	0	205
CC2	6	3	21	14	65	0	0	0	109
CC3	1	1	9	5	23	0	2	0	41
CC4	1	0	1	2	4	0	0	0	8
Sum	15	15	58	64	186	7	18	0	363

Table 8.8: Frequency of Cortex Cover Classes by Raw Material Proximity Type for Pueblo de la Mesa Plaza Debitage

	Local	Near-Local	Non-Local	All Types
CC1	88	94	23	205
CC2	44	65	0	109
CC3	16	23	2	41
CC4	4	4	0	8
Sum	152	186	25	363

debitage, with smaller proportions of CC3 and CC4 flakes comprising the remainder. In general this pattern is suggestive of mostly late stage of reduction, with lesser frequencies of early and middle stage reduction. All of the other raw material types in the plaza context have cortex cover distributions with high proportions of CC1 flakes and minimal representation of cortical flakes (CC2 – CC4). The lack of cortical flakes for these raw material types indicates that later stages of reduction were the principal mode of reduction.





The raw material proximity type data in Figure 8.6 indicates that local and near-local materials have a remarkably similar cortex cover distribution. The majority of the debitage for both distributions are CC1, followed by CC2 and CC3 flakes, with CC4 flakes constituting the remainder. This trend is indicative of mostly late stage reduction, with negligible amounts of early and middle stage reduction likely represented in the assemblages as well. The non-local distribution is almost completely comprised of CC1 debitage, indicating nearly exclusive late stage reduction of these raw materials.

Table 8.9: Chi-Square Comparison of the Cortex Cover Classes by Raw Material Proximity Type for Pueblo de la Mesa Plaza Debitage ($\chi^2 = 2.101$, $\alpha = 0.05$, $df = 3$, critical value = 7.815)			
	Local	Near-Local	Non-Local
CC1	88 (81.8)	94 (100.1)	NA
CC2	44 (49.0)	65 (59.8)	NA
CC3	16 (17.5)	23 (21.4)	NA
CC4	4 (3.6)	4 (4.4)	NA

Table 8.9 displays the chi-square comparison of the local and near-local cortex cover distributions. The non-local variety was excluded due to small observed and expected values. The chi-square test indicates that there is not a significant difference between the two distributions ($\chi^2 = 2.101$, $\alpha = 0.05$, $df = 3$, critical value = 7.815). There appears to be a markedly dissimilar distribution of non-local debitage in Figure 8.6, indicating a difference in utilization between local and near-local types, and the non-local stone. However, the lack of a chi-square test makes this statement difficult to substantiate.

Pueblo de la Mesa Debitage: Plaza Size Class

Tables 8.10 and 8.11 display the frequency of the size classes for the debitage from plaza context by raw material type and raw material proximity type, respectively. Figures 8.7 and 8.8 illustrate the relative frequency of the size classes by raw material type and raw material proximity type, respectively. The range of variation in Figure 8.7 is

Table 8.10: Frequency of Size Classes by Raw Material Type for Pueblo de la Mesa Plaza Debitage

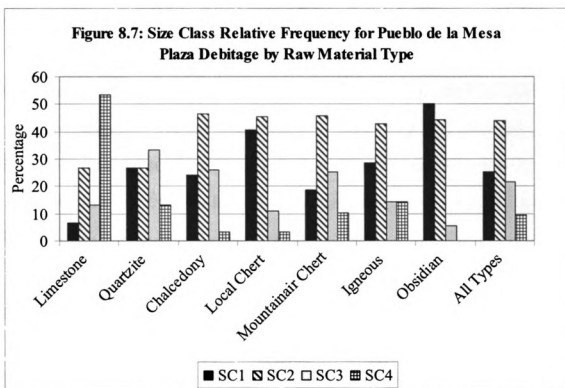
Note: Mtn. Chert = Mountainair Chert, Chal. = Chalcedony

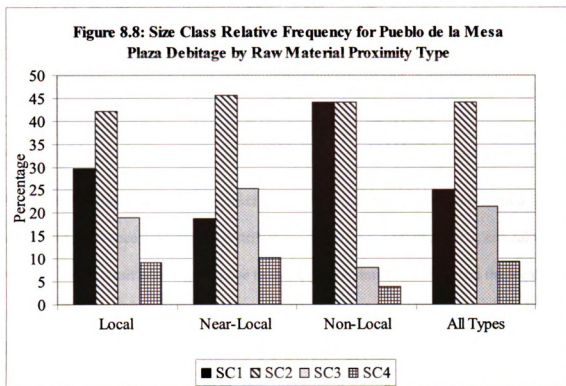
	Limestone	Quartzite	Chal.	Local Chert	Mtn. Chert	Igneous	Obsidian	Other	All Types
SC1	1	4	14	26	35	2	9	0	91
SC2	4	4	27	29	85	3	8	0	160
SC3	2	5	15	7	47	1	1	0	78
SC4	8	2	2	2	19	1	0	0	34
Sum	15	15	58	64	186	7	18	0	363

Table 8.11: Frequency of Size Classes by Raw Material Proximity Type for Pueblo de la Mesa Plaza Debitage

	Local	Near-Local	Non-Local	All Types
SC1	45	35	11	91
SC2	64	85	11	160
SC3	29	47	2	78
SC4	14	19	1	34
Sum	152	186	25	363

striking. The relatively high proportion of SC4 flakes in the limestone distribution is quite different than the other raw material types, suggesting earlier stages of reduction. Nearly all of the local chert and obsidian debitage belong to the smaller two flake size classes (SC1 and SC2), indicating that later stages of reduction may have been most common for these raw material types. Size Class 1 and SC2 flakes comprise the majority of the other raw material distributions, but the larger two sizes classes are also well represented (ranging from roughly 25% to 45% of the total). This mix of larger and smaller debitage is suggestive of a combination of early and late stage reduction for quartzite, chalcedony, Mountainair Chert, and igneous raw materials in the plaza context.





The raw material proximity type size class data displayed in Figure 8.8 indicates that the local and near-local distributions are quite similar in shape, with SC2 as the most common debitage size. The second and third most common size classes for these raw materials are SC1 and SC3 for the local, and SC3 and SC1 for the near-local. The higher relative frequency of SC1 flakes for the local types indicates that later stages of reduction may have been more common for these raw materials, while the higher proportion of SC3 debitage for the near-local type is indicative of more early stage reduction. The non-local distribution is dominated by smaller flakes, with the SC1 and SC2 debitage as the most common types. This trend indicates that later stages of reduction were likely the major reduction mode for non-local materials in plaza context.

Table 8.12 shows the chi-square comparison of the size class distributions among the raw material proximity types. The non-local materials were omitted from this test

Table 8.12: Chi-Square Comparison of the Size Classes by Raw Material Proximity Type for Pueblo de la Mesa Plaza Debitage ($\chi^2 = 5.87$, $\alpha = 0.05$, $df = 3$, critical value = 7.815)			
	Local	Near-Local	Non-Local
SC1	45 (36)	35 (44)	NA
SC2	64 (67)	85 (82)	NA
SC3	29 (34.2)	47 (41.8)	NA
SC4	14 (14.8)	19 (18.2)	NA

due to small sample size ($N=25$). The chi-square test indicates that there is a not a significant difference between the distributions ($\chi^2 = 5.87$, $\alpha = 0.05$, $df = 3$, critical value = 7.815). This result adds significance to the apparent similarities between the local and near-local raw materials identified in Figure 8.8.

Pueblo de la Mesa Debitage: Plaza Summary

The two variables were in general “agreement” about the levels of reduction exhibited in the plazadebitage. For both variables, local and near-local raw materials appear to have a mix of late and early stage reduction, while non-local raw materials exhibit strong evidence for almost exclusive late stage reduction. The significant difference detected among the distributions for the size class variable indicates that there may have been some raw material proximity specific use/deposition behaviors in the plaza context.

Pueblo de la Mesa Debitage: Midden Cortex Cover

Tables 8.13 and 8.14 display the frequency of the cortex cover classes for thedebitage from midden context by raw material type and raw material proximity type, respectively. Figures 8.9 and 8.10 display the relative frequency of the cortex cover classes by raw material type and raw material proximity type, respectively. The relatively high proportion of CC2debitage in Figure 8.9 distinguishes limestone from the other raw

material types in the midden context, indicating that earlier stages of reduction were more common for this stone variety. In the chalcedony and Mountainair Chert distributions

Table 8.13: Frequency of Cortex Cover Classes by Raw Material Type for Pueblo de la Mesa Midden Debitage

Note: Mtn. Chert = Mountainair Chert, Chal. = Chalcedony

	Limestone	Quartzite	Chal.	Local Chert	Mtn. Chert	Igneous	Obsidian	Other	All Types
CC1	3	6	6	11	42	5	6	2	81
CC2	5	1	5	5	33	1	0	0	50
CC3	1	0	2	0	10	0	0	0	13
CC4	0	0	0	0	2	0	0	0	2
sum	9	7	13	16	87	6	6	2	146

Table 8.14: Frequency of Cortex Cover Classes by Raw Material Proximity Type for Pueblo de la Mesa Midden Debitage

	Local	Near-Local	Non-Local	All Types
CC1	26	42	11	79
CC2	16	33	1	50
CC3	3	10	0	13
CC4	0	2	0	2
Sum	45	87	12	144

CC1 debitage are the most common, but there are also high proportions of CC2 and CC3 flakes, suggesting mostly later stages of reduction with some mixing of early stages as well. The quartzite, local chert, igneous, and obsidian distributions are all predominantly CC1 debitage, indicating that later stages of reduction were the norm for these stone types.

The raw material proximity type data shown in Figure 8.10 indicates that the local and near-local raw materials have almost identical cortex cover distributions typified by primarily CC1 flakes followed by CC2 debitage. This trend is indicative of mostly late stage reduction. The non-local distribution is almost completely composed of CC1 flakes, suggesting that late stage reduction was even more dominate for these stone types.

Figure 8.9: Cortex Cover Relative Frequency for Pueblo de la Mesa Midden Debitage by Raw Material Type

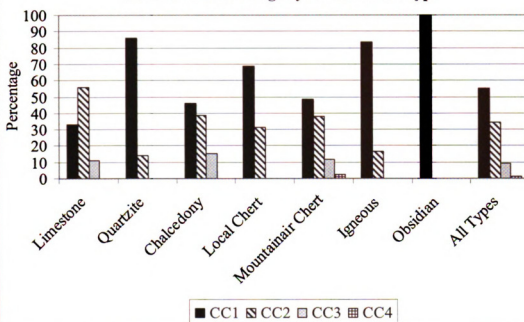


Figure 8.10: Cortex Cover Relative Frequency for Pueblo de la Mesa Midden Debitage by Raw Material Proximity Type

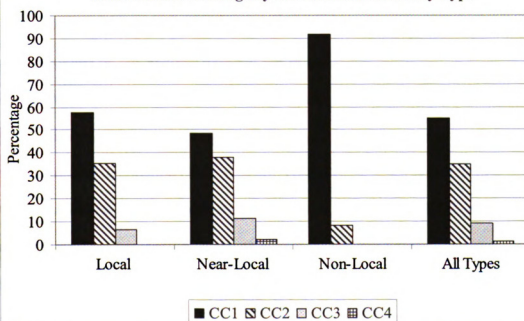


Table 8.15: Chi-Square Comparison of the Cortex Cover Classes by Raw Material Proximity Type for Pueblo de la Mesa Midden Debitage ($\chi^2 = 2.301$, $\alpha = 0.05$, $df = 3$, critical value = 7.815)			
	Local	Near-Local	Non-Local
CC1	26 (23.1)	42 (44.8)	NA
CC2	16 (16.7)	33 (32.3)	NA
CC3	3 (4.4)	10 (8.5)	NA
CC4	0 (0.6)	2 (1.3)	NA

Table 8.15 displays the chi-square comparison of the cortex cover classes between the local and near-local stone types. Due to small sample size the non-local raw material types were excluded from this comparison. The chi-square test indicates that there is not a significant difference between the local and near-local cortex cover distributions ($\chi^2 = 2.301$, $\alpha = 0.05$, $df = 3$, critical value = 7.815). Based on Figure 8.10 it appears that the non-local cortex cover distribution is different than the local and near-local distributions, perhaps due to more late stage reduction of the non-local raw materials. However, the lack of a definitive chi-square test decreases the confidence of this statement.

Pueblo de la Mesa Debitage: Midden Size Class

Tables 8.16 and 8.17 show the frequency of the size classes for thedebitage from midden context by raw material type and raw material proximity type, respectively. Figures 8.11 and 8.12 illustrate the relative frequency of the size classes by raw material type and raw material proximity type, respectively. The high proportion of SC4debitage in the limestone distribution (see Figure 8.11) is quite unlike the other raw material types. An emphasis on early stage reduction for limestone, as well as the large average package size of this raw material could have both been factors in this unique size class distribution. Chalcedony, local chert, Mountainair Chert, and igneous have distributions that range across many of the size classes, indicating a mix of early and later stages of

Table 8.16: Frequency of Size Classes by Raw Material Type for Pueblo de la Mesa Midden Debitage

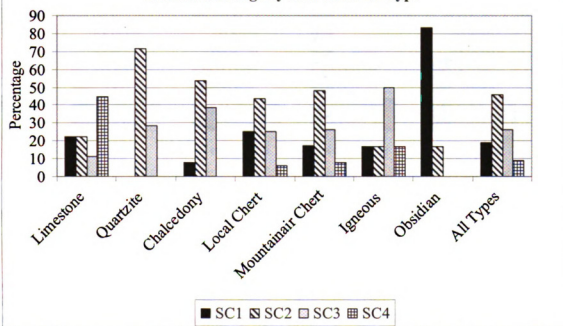
Note: Mtn. Chert = Mountainair Chert, Chal. = Chalcedony

	Limestone	Quartzite	Chal.	Local Chert	Mtn. Chert	Igneous	Obsidian	Other	All Types
SC1	2	0	1	4	15	1	5	0	28
SC2	2	5	7	7	42	1	1	2	67
SC3	1	2	5	4	23	3	0	0	38
SC4	4	0	0	1	7	1	0	0	13
sum	9	7	13	16	87	6	6	2	146

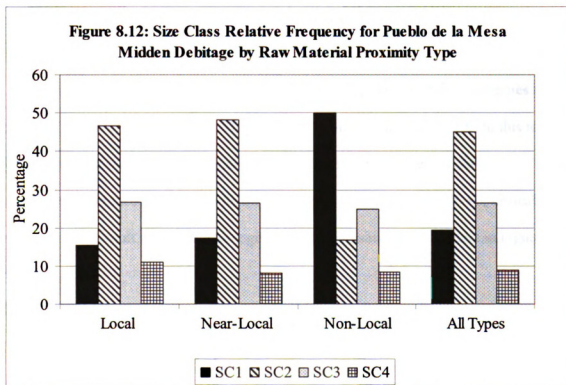
Table 8.17: Frequency of Size Classes by Raw Material Proximity Type for Pueblo de la Mesa Midden Debitage

	Local	Near-Local	Non-Local	All Types
SC1	7	15	6	28
SC2	21	42	2	65
SC3	12	23	3	38
SC4	5	7	1	13
Sum	45	87	12	144

Figure 8.11: Size Class Relative Frequency for Pueblo de la Mesa Midden Debitage by Raw Material Type



reduction. The high relative frequencies of SC1 and SC2 flakes for local chert and Mountainair Chert indicate that late stage reduction was an important component to the use of these stone types. The high relative frequency of SC3 debitage for the chalcedony and igneous raw materials is suggestive of more early stage reduction for these raw materials, although the unknown igneous average package size makes this determination difficult to substantiate. The very high proportion of SC1 debitage in the obsidian distribution distinguishes this raw material type, and indicates a high degree of late stage reduction.



The local and near-local size class distributions (see Figure 8.12) are nearly identical, with SC2 debitage as the most common, followed by SC3, then SC1 and SC4 flakes. The high proportion of middle sized debitage (SC2 and SC3) for these stone types suggests a combination of early and late stage reduction and/or middle stage

reduction. The non-local distribution is moderately divergent from the local and near-local, with a higher proportion of SC1 flakes, a lower proportion of SC2 flakes, and equitable proportions of SC3 and SC4 flakes. This pattern suggest that there may have been more late stage reduction of non-local raw materials, but earlier stages of reduction were also an important feature of the non-local utilization.

Table 8.18: Chi-Square Comparison of the Size Classes by Raw Material Proximity Type for Pueblo de la Mesa Midden Debitage ($\chi^2 = 0.374$, $\alpha = 0.05$, $df = 3$, critical value = 7.815)			
	Local	Near-Local	Non-Local
SC1	7 (7.5)	15 (14.5)	NA
SC2	21 (21.5)	42 (41.5)	NA
SC3	12 (11.9)	23 (23.1)	NA
SC4	5 (4.09)	7 (7.91)	NA

Table 8.18 displays the chi-square comparison of the size class frequencies among the raw material proximity types. The non-localdebitage was excluded from this test due to small sample size (N=12). The chi-square test indicates that there is not a significant difference between the distributions ($\chi^2 = 0.374$, $\alpha = 0.05$, $df = 3$, critical value = 7.815). This result is not surprising given the overall similarities evident in Figure 8.12.

Pueblo de la Mesa Debitage: Midden Summary

The interpretations of the twodebitage variables generally corresponded for the raw material proximity types in the midden context. Both the cortex cover and size class data indicate that local and near-local raw materials were used in a similar manner, which was a combination of late and early stages of reduction and/or middle stage reduction. The late stage reduction typical of the non-local raw materials was evidenced by few cortical flakes and generally smalldebitage.

Pueblo de la Mesa Debitage: Site Cortex Cover

Tables 8.19 and 8.20 display the frequency of the cortex cover classes for the debitage from the entire site by raw material type and raw material proximity type, respectively. Figures 8.13 and 8.14 illustrate the relative frequency of the cortex cover classes by raw material type and raw material proximity type, respectively. The most common cortex cover class for limestone (see Figure 8.13) is CC2, followed by CC1, with smaller proportions of CC3 and CC4 debitage. This pattern, which was also observed in each of the individual contexts, is suggestive of relatively more early stage reduction of limestone compared to the other raw material types at the site. Chalcedony, local chert, and Mountainair Chert all have similar distributions, with CC1 flakes the most common, followed by CC2, with smaller frequencies of CC3 and CC4 debitage. This pattern was also observed in each of the individual contexts and is characteristic of mostly later stages of reduction with lesser frequencies of early/middle stages of

Table 8.19: Frequency of Cortex Cover Classes by Raw Material Type for Pueblo de la Mesa Debitage

Note: Mtn. Chert = Mountainair Chert, Chal. = Chalcedony

	Limestone	Quartzite	Chal.	Local Chert	Mtn. Chert	Igneous	Obsidian	Other	All Types
CC1	14	24	48	84	208	20	25	3	426
CC2	16	5	40	33	151	2	1	0	248
CC3	3	1	12	7	46	2	2	0	73
CC4	3	0	2	2	7	0	0	0	14
Sum	36	30	102	126	412	24	28	3	761

Table 8.20: Frequency of Cortex Cover Classes by Raw Material Proximity Type for Pueblo de la Mesa Debitage

	Local	Near-Local	Non-Local	All Types
CC1	170	208	45	423
CC2	94	151	3	248
CC3	23	46	4	73
CC4	7	7	0	14
Sum	294	412	52	758

Figure 8.13: Cortex Cover Relative Frequency for Pueblo de la Mesa Debitage by Raw Material Type

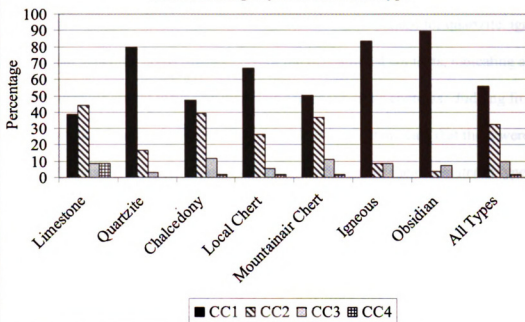
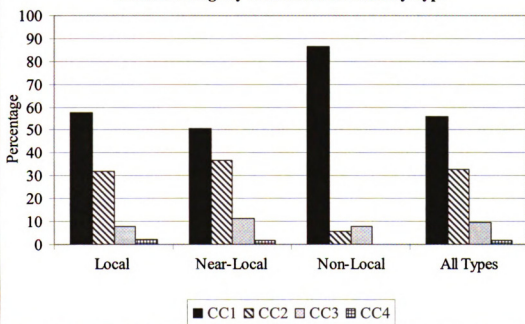


Figure 8.14: Cortex Cover Relative Frequency for Pueblo de la Mesa Debitage by Raw Material Proximity Type



reduction. The quartzite, igneous, and obsidian distributions are all dominated by CC1 flakes, with relatively small quantities of CC2 and CC3 flakes, indicating mostly later stages of reduction for these raw materials at the site. This pattern for quartzite, igneous, and obsidian generally holds true for each of the depositional contexts, indicating a relatively uniform use of these raw materials across the site's contexts. Judging from the cortex cover distributions in Figures 8.1, 8.5, 8.9 and 8.13 it appears that there were no strong differences among the depositional contexts for any of the raw material types at the site.

The same consistency of cortex cover distributions across the site can also be observed for the raw material proximity types in Figures 8.2, 8.6, 8.10, and 8.14. For all of the depositional contexts, as well as the site-wide data, both local and near-local raw materials have consistent distributions comprised of mostly CC1 flakes, followed by CC2, with lesser amounts of CC3 and CC4 debitage. This pattern for local and near-local materials is indicative of predominately late stage reduction mixed with some early/middle stages of reduction. The non-local raw material distributions in Figures 8.2, 8.6, 8.10, and 8.14 are also remarkably consistent across the site, with the CC1 as the dominant cortex cover class, followed by negligible proportions of cortical flakes (CC2 and CC3). This non-local cortex cover trend indicates that later stages of reduction were the norm for these raw materials at the site.

Table 8.21: Chi-Square Comparison of the Cortex Cover Classes by Raw Material Proximity Type for Pueblo de la Mesa Debitage ($\chi^2 = 5.17$, $\alpha = 0.05$, $df = 3$, critical value = 7.815)			
	Local	Near-Local	Non-Local
CC1	170 (157)	208 (221)	NA
CC2	94 (102)	151 (143)	NA
CC3	23 (28.7)	46 (40.3)	NA
CC4	7 (5.8)	7 (8.1)	NA

Table 8.21 presents the chi-square comparison of the site-wide distributions of the cortex cover classes among the raw material proximity types. The non-local debitage was omitted from the test due small expected frequencies for the CC3 and CC4 cortex cover classes. The chi-square test indicates that there is not significant difference between the local and near-local raw material proximity types ($\chi^2 = 5.17$, $\alpha = 0.05$, $df = 3$, critical value = 7.815).

Pueblo de la Mesa Debitage: Site Size Class

Tables 8.22 and 8.23 display the frequency of the size classes for the debitage from the site by raw material type and raw material proximity type, respectively. Figures 8.15 and 8.16 illustrate the relative frequency of the size classes by raw material type and raw material proximity type, respectively. The high relative frequency of SC4 flakes for limestone (see Figure 8.15) is consistent with the distributions from each of the individual

Table 8.22: Frequency of Size Classes by Raw Material Type for Pueblo de la Mesa Debitage

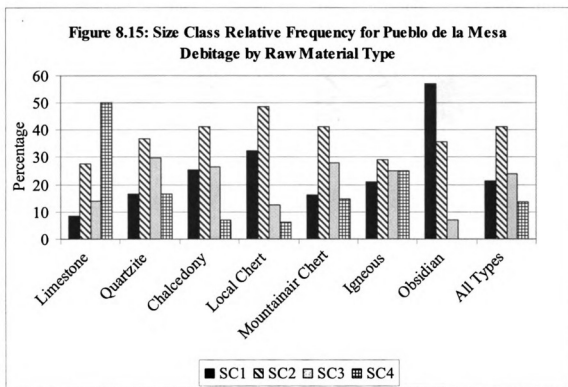
Note: Mtn. Chert = Mountainair Chert, Chal. = Chalcedony

	Limestone	Quartzite	Chal.	Local Chert	Mtn. Chert	Igneous	Obsidian	Other	All Types
SC1	3	5	26	41	66	5	16	0	162
SC2	10	11	42	61	170	7	10	2	313
SC3	5	9	27	16	115	6	2	1	181
SC4	18	5	7	8	61	6	0	0	105
Sum	36	30	102	126	412	24	28	3	761

Table 8.23: Frequency of Size Classes by Raw Material Proximity Type for Pueblo de la Mesa Debitage

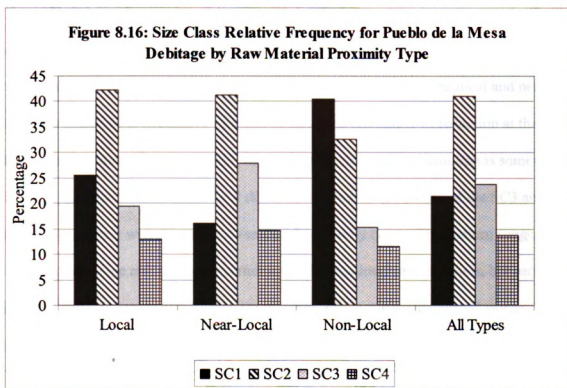
	Local	Near-Local	Non-Local	All Types
SC1	75	66	21	162
SC2	124	170	17	311
SC3	57	115	8	180
SC4	38	61	6	105
Sum	294	412	52	758

material was likely a contributing factor to the overall prevalence of large limestone debitage. Site-wide the quartzite distribution is comprised of primarily of smaller flakes (SC1 and SC2), but there are also relatively high frequencies of SC3 and SC4 debitage, indicating that early and late stages of reduction were both common for this raw material type. The room and plaza context quartzite distributions (see Figures 8.3 and 8.7) have higher proportions of SC3 and SC4 debitage than the midden context (see Figure 8.11), indicating that more early stage reduction was common in these contexts.



Site-wide, chalcedony, local chert, and Mountainair Chert all have relatively high proportions of SC1 and SC2 flakes, indicating that later stages of reduction were the most common mode of reduction for these raw materials. This pattern is generally true across the three depositional contexts (see Figures 8.3, 8.7, and 8.11) for chalcedony, local chert

and Mountainair Chert, except in the room context where there are higher frequencies of larger flakes (SC3 and SC4). This pattern indicates that early stage reduction was more



common for these raw materials in the room context, relative to the plaza and midden contexts. The site-wide igneous data (see Figure 8.15) has nearly consistent representation of each size class, suggesting that the general use of this raw material involved a mix of early and late stage reduction. The room and midden (see Figures 8.3 and 8.11) igneous distributions have higher proportions of the larger SC3 and SC4 debitage than the plaza context (see Figure 8.7), suggesting that early stage reduction was more important in these contexts. Obsidian has a relatively consistent size class distribution across the three depositional contexts (see Figures 8.3, 8.7, and 8.11), with smaller debitage (SC1 and SC2) as the most common size classes. The overall obsidian size class distribution (see Figure 8.15), as well as the distributions from each of

the contexts, indicates that the dominate mode of reduction for this raw material was late stage.

The site-wide raw material proximity data in Figure 8.16 displays remarkably similar distributions for the local and near-local raw materials, with SC2 flakes as the most common size class followed by SC3. This overall pattern for the local and near-local raw materials is suggestive of a mix of early and late stages of reduction at the site. The higher relative frequency of SC1 debitage in the non-local distribution is somewhat different than the local and near-local distributions, but the frequency of the SC3 and SC4 flakes is consistent with the other raw material proximity types. This pattern suggests that more late stage reduction was common for the non-local raw materials, but earlier stages of reduction were also an important feature of the non-local chipped stone technology.

Table 8.24: Chi-Square Comparison of the Size Classes by Raw Material Proximity Type for Pueblo de la Mesa Debitage ($\chi^2 = 25.2$, $\alpha = 0.05$, $df = 6$, critical value = 12.592)			
	Local	Near-Local	Non-Local
SC1	75 (62.8)	66 (88.1)	21 (11.1)
SC2	124 (121)	170 (169)	17 (21.3)
SC3	57 (69.8)	115 (97.8)	8 (12.3)
SC4	38 (40.7)	61 (57.1)	6 (7.2)

The chi-square comparison of the size class distributions among the raw material proximity types at the site is displayed in Table 8.24. This chi-square test indicates that there is a significant difference among the raw material proximity types ($\chi^2 = 25.2$, $\alpha = 0.05$, $df = 6$, critical value = 12.592). In the graphical illustration of the data (Figure 8.16), it is clear that a major incongruity is the high proportion of SC1 flakes for the non-local raw materials, and the higher proportion of SC3 flakes for the near-local raw

materials. Based on the chi-square test and Figure 8.16, it appears that there were important technological differences in the reduction of the raw material proximity types. One of these differences is the relatively high frequency of late stage reduction for the non-local raw materials. A less pronounced difference between the local and near-local raw materials is the higher frequency of late stage reduction of local materials, as evidenced by higher proportions of SC1 flakes.

Pueblo de la Mesa Debitage: Intra-Site Comparison among Depositional Contexts

Table 8.25 presents a summary of the chi-square comparisons of the cortex cover distributions across the depositional contexts for the local, near-local, and non-local materials. The chi-square test for the local ($\chi^2 = 5.415$, $\alpha = 0.05$, $df = 6$, critical value = 12.592), near-local ($\chi^2 = 2.251$, $\alpha = 0.05$, $df = 6$, critical value = 12.592), and the non-local⁷ ($\chi^2 = 5.038$, $\alpha = 0.05$, $df = 4$, critical value = 9.488) types all indicate that there is not a significant difference among the depositional contexts. These findings confirm the statements made about the graphically apparent consistent local, near-local, and non-local cortex cover distributions.

Table 8.25: Summary of the Chi-Square Comparisons of Cortex Cover Classes by Raw Material Proximity Types across each of the Depositional Contexts at Pueblo de la Mesa				
Raw Material (Test)	χ^2	χ^2 Critical Value	Significance	Note
Local (CC)	5.415	12.592	No	
Near-Local (CC)	2.251	12.592	No	
Non-Local (CC)	5.038	5.991	No	Not Valid

Table 8.26 presents a summary of the chi-square comparisons of the size class distributions across the depositional contexts for the local and near-local materials. The chi-square test for the local materials indicates that there is not a significant difference

⁷ CC4, non-local flakes were omitted from the chi-square analysis, due to low frequency.

Table 8.26: Summary of the Chi-Square Comparisons of Size Classes by Raw Material Proximity Types across each of the Depositional Contexts at Pueblo de la Mesa				
Raw Material (Test)	χ^2	χ^2 Critical Value	Significance	Note
Local (SC)	9.9	12.592	No	
Near-Local (SC)	25.2	12.592	Yes	
Non-Local (SC)	9.27	5.991	No	Not Valid

among the depositional contexts ($\chi^2 = 9.90$, $\alpha = 0.05$, $df = 6$, critical value = 12.592). This result is in concordance with the graphical interpretation of the local material type data discussed above. The chi-square test for the near-local raw materials indicates that there is a significant difference among the depositional contexts ($\chi^2 = 25.2$, $\alpha = 0.05$, $df = 6$, critical value = 12.592). This result is not overly surprising given the differences between the room context and the rest of the depositional contexts discussed above. Most notably, the high proportion of SC3 and SC4 flakes in the room context, suggesting that more early stage reduction was common to this depositional context for the near-local materials. The small sample size of non-local debitage prevented a depositional context comparison for this raw material proximity type.

Pueblo de la Mesa Cores: Room Context

Table 8.27 displays the completeness factor corrected curation level data by raw material type for the cores from room context. Over 60% of the Mountainair Chert cores, the most commonly used raw material for core manufacture (N=13), are CL2 (i.e. unidirectional and multidirectional). Local chert, the next most common raw material type (N=4), has equal proportions of CL1 and CL2 cores. All of the other raw materials used to make cores deposited in the room context have only a single example; limestone and igneous are both CL2 and the chalcedony core is CL1 (i.e. bipolar). The low

frequency of cores in the room context makes it difficult to distinguish trends in the data, which prevents this section from being more than a description.

Table 8.27: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Type for Pueblo de la Mesa Room Cores								
Note: Mtn. Chert = Mountainair Chert, Chal. = Chalcedony								
	Limestone	Quartzite	Chal.	Local Chert	Mtn. Chert	Igneous	Obsidian	All Types
CL1	0	0	1	2	5	0	0	8
CL2	1	0	0	2	8	1	0	12
Sum	1	0	1	4	13	1	0	20

Table 8.28: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Proximity Type for Pueblo de la Mesa Room Cores				
	Local	Near-Local	Non-Local	All Types
CL1	3	5	0	8
CL2	3	8	1	12
Sum	6	13	1	20

The raw material proximity type core curation level data are presented in Table 8.28. The local raw materials (N=6) have equal frequencies of CL1 and CL2 cores. The near-local raw materials (N=13) are predominately CL2 cores (62%). The single example of a non-local core from the room context is a CL2 core. Overall the cores in the room context are primarily CL2 (60%).

Pueblo de la Mesa Cores: Plaza Context

Table 8.29 displays the completeness factor corrected curation level data by raw material type for the cores recovered in the plaza context. Just as in the room context, Mountainair Chert was the most common raw material type used to fashion the plaza cores (N=13). The curation level distribution for the Mountainair Chert plaza cores was also identical to the room cores, with 62% CL2 cores. The next most common raw material type for the plaza cores was local chert (N=3), of which 66% were CL1. All of

the quartzite (N=2) cores from this context were CL2. All of the chalcedony (N=2) and obsidian (N=1) cores were CL1.

Table 8.29: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Type for Pueblo de la Mesa Plaza Cores Note: Mtn. Chert = Mountainair Chert, Chal. = Chalcedony								
	Limestone	Quartzite	Chal.	Local Chert	Mtn. Chert	Igneous	Obsidian	All Types
CL1	0	0	2	2	5	0	1	10
CL2	0	2	0	1	8	0	0	11
Sum	0	2	2	3	13	0	1	21

Table 8.30: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Proximity Type for Pueblo de la Mesa Plaza Cores				
	Local	Near-Local	Non-Local	All Types
CL1	4	5	1	10
CL2	3	8	0	11
Sum	7	13	1	21

The raw material proximity type core curation level data are displayed in Table 8.30. Nearly 58% of the local cores (N=7) were CL1, while only 38% of the near-local cores were CL1 in the plaza context. The lone example of a non-local core was CL1.

Pueblo de la Mesa Cores: Midden Context

Table 8.31 presents the completeness factor corrected frequency of core curation levels by raw material type for the cores from midden context. As in the room and plaza context, Mountainair Chert (N=10) was the most commonly used raw material type in the midden. Unlike the other contexts, however, most of the Mountainair Chert cores were CL1 (60%). Obsidian, the next most common raw material type (N=2) has equal proportions of CL1 and CL2 cores. The remaining raw material types used to make cores deposited in the midden context have only one example; the single chalcedony core is CL1 and the local chert core is CL2.

The raw material proximity type data displayed in Table 8.32 shows that the local (N=2) and non-local (N=2) materials both had equal representation of the curation levels. The near-local raw materials had a higher frequency of CL1 cores (60%) than CL2 cores (40%).

Table 8.31: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Type for Pueblo de la Mesa Midden Cores

Note: Mtn. Chert = Mountainair Chert, Chal. = Chalcedony

	Limestone	Quartzite	Chal.	Local Chert	Mtn. Chert	Igneous	Obsidian	All Types
CL1	0	0	1	0	6	0	1	8
CL2	0	0	0	1	4	0	1	6
Sum	0	0	1	1	10	0	2	14

Table 8.32: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Proximity Type for Pueblo de la Mesa Midden Cores

	Local	Near-Local	Non-Local	All Types
CL1	1	6	1	8
CL2	1	4	1	6
Sum	2	10	2	14

Pueblo de la Mesa Cores: Site

Table 8.33 displays the completeness factor corrected core curation level data by raw material type for all of Pueblo de la Mesa. The most common raw material type, Mountainair Chert (N=36), was used primarily to manufacture CL2 cores (56%). The next most common raw material, local chert (N=8), had an equal proportion of CL1 and CL2 cores. All of the chalcedony cores (N=4) were CL1, while all of the limestone

Table 8.33: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Type for Pueblo de la Mesa Cores

Note: Mtn. Chert = Mountainair Chert, Chal. = Chalcedony

	Limestone	Quartzite	Chal.	Local Chert	Mtn. Chert	Igneous	Obsidian	All Types
CL1	0	0	4	4	16	0	2	26
CL2	1	2	0	4	20	1	1	29
Sum	1	2	4	8	36	1	3	55

(N=1), quartzite (N=2), and igneous (N=1) cores were CL2. Obsidian, which was the fourth most common core raw material type, was primarily used to produce CL1 cores (66%).

Table 8.34: Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Proximity Type for Pueblo de la Mesa Cores				
	Local	Near-Local	Non-Local	All Types
CL1	8	16	2	26
CL2	7	20	2	29
Sum	15	36	4	55

The raw material proximity type core curation level data are presented in Table 8.34. Both the local (N=15) and non-local (N=4) raw materials have nearly equal proportions of CL1 and CL2 cores. Near-local raw materials were primarily used to manufacture CL2 cores, which constitute 56% of its total. When all of the raw material types are considered together, the proportional importance of CL1 and CL2 cores is almost equal (47% and 53%, respectively).

Table 8.35: Chi-Square Comparison of the Completeness Factor Corrected Frequency of Core Curation Levels by Raw Material Proximity Type for Pueblo de la Mesa Cores ($\chi^2 = 0.336$, $\alpha = 0.05$, $df = 1$, critical value = 3.841)			
	Local	Near-Local	Non-Local
CL1	8 (7.06)	16 (16.9)	NA
CL2	7 (7.94)	20 (19.1)	NA

Table 8.35 presents the chi-square comparison of the core curation level data for the local and near-local raw material types at the site. The non-local type was omitted from this chi-square analysis because of low sample size. The chi-square test indicates that there is not a significant difference between the local and near-local cores ($\chi^2 = 0.336$, $\alpha = 0.05$, $df = 1$, critical value = 3.841). This result indicates that differences

among the raw material proximity types did not play a significant role in structuring the core curation level decisions.

Unfortunately the overall low occurrence of cores at Pueblo de la Mesa does not allow for a meaningful comparison of the core curation levels by raw material proximity type among the three depositional contexts. However, an inspection of Tables 8.28, 8.30, and 8.32, suggests that there are not any pronounced patterns in core use/deposition among the contexts.

Pueblo de la Mesa Tools: Room Context

Tables 8.36 and 8.37 display the completeness factor corrected frequencies of the tool curation levels by raw material type and raw material proximity type for the room context, respectively. Figures 8.17 and 8.18 illustrate the completeness factor corrected relative frequency of tool curation levels by raw material type and raw material proximity type, respectively. In Figure 8.17 we see that the full range of tool curation levels are represented for the three most common raw material types found in the room context (chalcedony, local chert, and Mountainair Chert). The high proportion of CL4 tools for the local chert suggests that while there were a wide range of tool utilization/deposition behaviors for this raw material, there was a clear emphasis on heavily curated tools. The lightly curated CL1 and CL2 tools are the

Table 8.36: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Type for Pueblo de la Mesa Room Tools								
Note: Mtn. Chert = Mountainair Chert, Chal. = Chalcedony								
	Limestone	Quartzite	Chal.	Local Chert	Mtn. Chert	Igneous	Obsidian	All Types
CL1	0	1	4.8	1.2	21.6	0	0	28.6
CL2	0	0.6	3	1	10	0	0.6	15.2
CL3	0	0	1.2	1	9	0	0	11.2
CL4	0	0.6	2.2	3.1	5.1	1	0.8	12.8
Sum	0	2.2	11.2	6.3	45.7	1	1.4	67.8

Table 8.37: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Proximity Type for Pueblo de la Mesa Room Tools				
	Local	Near-Local	Non-Local	All Types
CL1	7	21.6	0	28.6
CL2	4.6	10	0.6	15.2
CL3	2.2	9	0	11.2
CL4	5.9	5.1	1.8	12.8
Sum	19.7	45.7	2.4	67.8

dominate curation levels for both chalcedony and Mountainair Chert, making up roughly 70% of the total. The smaller proportions of CL3 and CL4 tools for these raw material types indicates that there was some use/deposition of more heavily curated tools, but this was not the primary behavior in the room context. The same general pattern is observed for quartzite, which also has roughly 70% CL1 and CL2 tools. Igneous and obsidian, which are found in low frequencies in the room context (N=1 and N=1.4, respectively), both have relatively high proportions of CL4 tools (100% and 47%, respectively). Although the small sample size makes it difficult to assign meaning to these figures, they hint at the possibility of a more specialized use/deposition for igneous and obsidian stone in room context.

The raw material proximity type data illustrated in Figure 8.18 display some pronounced differences in the tool curation level distributions. The relatively high proportion of CL4 tools in the non-local distribution distinguishes this raw material proximity type, possibly indicating a more specialized use/deposition. The low overall frequency of non-local tools, however, makes this proposition provisional. Both local and near-local raw material distributions have the full range of curation levels represented, suggesting a diverse deposition/use of these raw material types. The primary difference

between the two types is the higher proportion of CL1 tools for the near-local raw materials and the higher proportion of CL4 tools for the local raw materials.

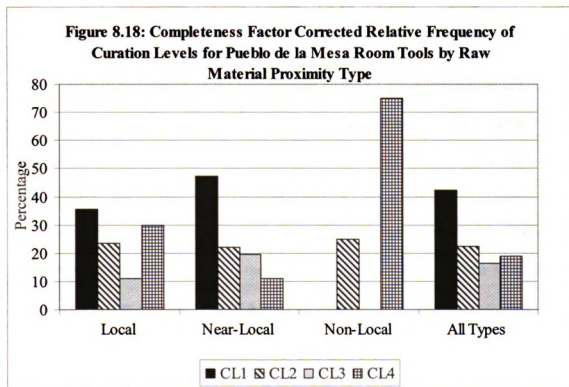
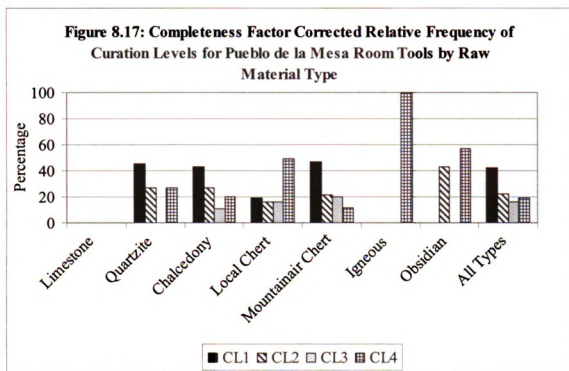


Table 8.38: Chi-Square Comparison of the Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Proximity Type for Pueblo de la Mesa Room Tools ($\chi^2 = 4.41$, $\alpha = 0.05$, $df = 3$, critical value = 7.815)			
	Local	Near-Local	Non-Local
CL1	7 (8.7)	21.6 (20.2)	NA
CL2	4.6 (4.5)	10 (10.5)	NA
CL3	2.2 (3.3)	9 (7.6)	NA
CL4	5.9 (3.3)	5.1 (7.6)	NA

Table 8.38 shows the chi-square comparison of the tool curation level data for the local and near-local raw material types. Non-local raw materials were omitted from the analysis due to small sample size ($N = 2.4$). The chi-square test indicates that there is not a significant difference between the two distributions ($\chi^2 = 4.41$, $\alpha = 0.05$, $df = 3$, critical value = 7.815).

Pueblo de la Mesa Tools: Plaza Context

Tables 8.39 and 8.40 display the completeness factor corrected frequencies of the curation levels by raw material type and raw material proximity type for the tools from plaza context, respectively. Figures 8.19 and 8.20 illustrate the completeness factor corrected relative frequencies of the tool curation levels by raw material type and raw material proximity type, respectively. The four most common raw material types (chalcedony, local chert, Mountainair Chert, and obsidian) all have tools from each of the curation levels. The most common curation levels for chalcedony and Mountainair Chert are CL3 (roughly 40%), followed by CL1 (roughly 25%). The major difference between chalcedony and Mountainair Chert is the higher proportion of CL2 tools for Mountainair Chert and the higher proportion of CL4 tools for chalcedony. Of the common raw materials from the room context, local chert has a notably higher frequency of CL4 tools, which is similar to the pattern observed in the room context suggesting that this raw

material type may have been favored for the manufacture CL4 tools (especially projectile points) at the site. There are also significant proportions of the other tool curation classes for the local chert, which suggests that the utilization of this raw material was not only limited to highly curated tools. The generalized use/deposition of obsidian tools in the plaza context is evidenced by the relatively even representation of tool curation classes. Quartzite (N=0.4) and igneous (N=0.6) tools were recovered in small quantities in the plaza. All of the quartzite tools were CL3, while all of the igneous tools were CL1.

Table 8.39: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Type for Pueblo de la Mesa Plaza Tools
Note: Mtn. Chert = Mountainair Chert, Chal. = Chalcedony

	Limestone	Quartzite	Chal.	Local Chert	Mtn. Chert	Igneous	Obsidian	All Types
CL1	0	0	3	4	4.8	0.6	1	13.4
CL2	0	0	1.4	3.4	4.4	0	0.6	9.8
CL3	0	0.4	4.4	2	7.8	0	1	15.6
CL4	0	0	2.4	6.4	2.2	0	0.6	11.6
Sum	0	0.4	11.2	15.8	19.2	0.6	3.2	50.4

Table 8.40: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Proximity Type for Pueblo de la Mesa Plaza Tools

	Local	Near-Local	Non-Local	All Types
CL1	7	4.8	1.6	13.4
CL2	4.8	4.4	0.6	9.8
CL3	6.8	7.8	1	15.6
CL4	8.8	2.2	0.6	11.6
Sum	27.4	19.2	3.8	50.4

The local, near-local, and non-local tool curation level distributions in Figure 8.20 are all quite unlike each other. The most common curation level for the local tools is CL4 (32%), which is notably different than the near-local and non-local raw materials.

Figure 8.19: Completeness Factor Corrected Relative Frequency of Curation Levels for Pueblo de la Mesa Plaza Tools by Raw Material Type

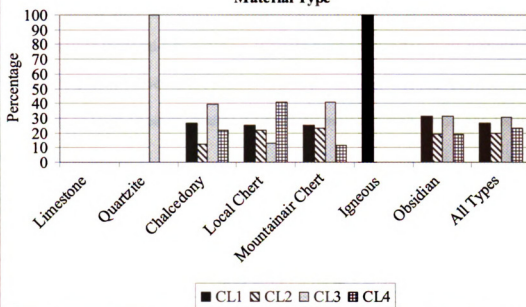
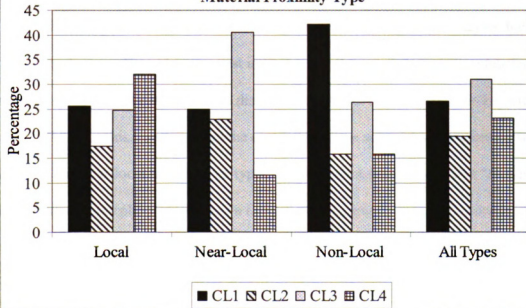


Figure 8.20: Completeness Factor Corrected Relative Frequency of Curation Levels for Pueblo de la Mesa Plaza Tools by Raw Material Proximity Type



The other curation levels are also found in fairly high proportions (between 17% and 26%) for the local materials indicating that there was an essentially generalized use/deposition of these materials, with slightly more utilization of more heavily curated tools. Similar to the local raw materials, the near-local and non-local raw materials had relatively high frequencies of the four tool curation levels, except that CL3 tools were the most common for the near-local and CL1 were the most common for the non-local raw materials.

Table 8.41: Chi-Square Comparison of the Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Proximity Type for Pueblo de la Mesa Plaza Tools ($\chi^2 = 2.45$, $\alpha = 0.05$, $df = 3$, critical value = 7.815)			
	Local	Near-Local	Non-Local
CL1	7 (6.8)	4.8 (5.1)	NA
CL2	4.8 (5.7)	4.4 (4.2)	NA
CL3	6.8 (8.5)	7.8 (6.4)	NA
CL4	8.8 (6.8)	2.2 (5.1)	NA

Table 8.41 displays the chi-square comparison of tool curation levels between the local and near-local materials. Non-local tools were omitted from the analysis due to small sample size. The chi-square test indicates that there is not a significant difference between the local and near-local tool distributions ($\chi^2 = 2.45$, $\alpha = 0.05$, $df = 3$, critical value = 7.815). This result tempers the discussion of the apparent differences between the local and near-local raw material types, which are not pronounced. The “all types” distribution for the plaza context has a fairly even proportion of all of the curation levels, ranging from 19% to 31%. There are slightly more heavily curated tools (CL3 and CL4) in this context, indicating that greater utilization/deposition of these tool types was also a component of the more generalized pattern.

Pueblo de la Mesa Tools: Midden Context

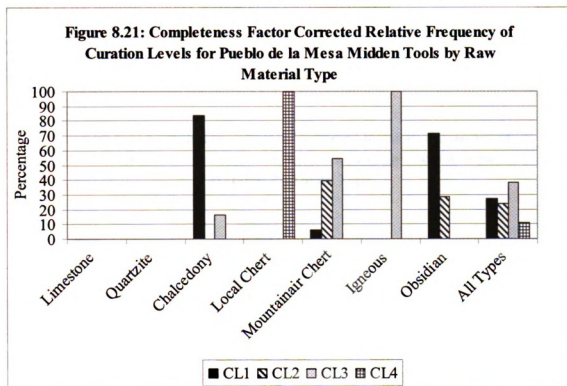
Tables 8.42 and 8.43 present the completeness factor corrected frequencies of the curation levels by raw material type and raw material proximity type for the tools from midden context, respectively. Figures 8.21 and 8.22 illustrate the completeness factor corrected relative frequency of the tool curation levels by raw material type and raw material proximity type, respectively. The overall completeness factor corrected frequency for the midden tools is quite low (N=12.6). This low frequency makes it difficult to discern tool curation level trends, especially when considering the non-aggregated raw material types. Mountainair Chert, the most commonly recovered tool stone type in the midden, has a high proportion of CL3 tools (55%), followed by CL2 tools (39%), with the lightly curated CL1 tools comprising the remainder. Over 80% of the chalcedony tools are CL1, with CL3 tools constituting the rest of the tools for this raw material type. The majority of the obsidian tools (71%) are also CL1, with CL2 tools comprising the rest. It is interesting that all of the obsidian tools recovered in the midden context are lightly curated (CL1 and CL2), which was not the case for the other depositional contexts (see Figures 8.17 and 8.19). All of the local chert tools are CL4, which corresponds well with the distributions from the other two contexts. All of the igneous tools are CL3, which is unlike the distributions from the other two contexts.

Table 8.42: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Type for Pueblo de la Mesa Midden Tools								
Note: Mtn. Chert = Mountainair Chert, Chal. = Chalcedony								
	Limestone	Quartzite	Chal.	Local Chert	Mtn. Chert	Igneous	Obsidian	All Types
CL1	0	0	2	0	0.4	0	1	3.4
CL2	0	0	0	0	2.6	0	0.4	3
CL3	0	0	0.4	0	3.6	0.8	0	4.8
CL4	0	0	0	1.4	0	0	0	1.4
Sum	0	0	2.4	1.4	6.6	0.8	1.4	12.6

However, the very low frequency of igneous tools at the site (N=2.4) makes distinguishing any spatial trends for this raw material type problematic.

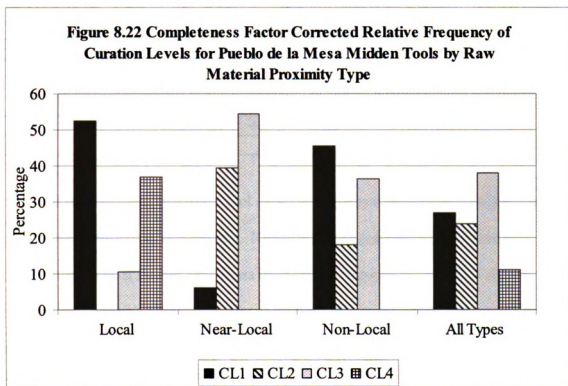
Table 8.43: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Proximity Type for Pueblo de la Mesa Midden Tools

	Local	Near-Local	Non-Local	All Types
CL1	2	0.4	1	3.4
CL2	0	2.6	0.4	3
CL3	0.4	3.6	0.8	4.8
CL4	1.4	0	0	1.4
Sum	3.8	6.6	2.2	12.6



The aggregated raw material proximity type distributions displayed in Figure 8.22 show quite a range of variation. Over 50% of the local tools were CL1, while the rest of the tools were the more curated CL3 (11%) and CL4 (37%). In contrast, the majority of the near-local tools were CL3 (over 50%) and CL2 (39%), with the remainder of the tools belonging to CL1. The non-local tools were primarily CL1 (45%) and CL3 (36%), with a

smaller proportion of CL2 tools (18%). In general, all of the raw material proximity types had a wide range of curation levels in their distributions, with no single curation level dominating any of the raw material proximity types. As a whole, the most common midden tools were CL3 (38%), with much of the rest of the total comprised of the lightly curated CL1 (26%) and CL2 (24%) tools. The overall proportion of CL4 tools was the smallest of the depositional contexts in the midden, indicating that there may have been some unique behaviors associated with this light deposition. Due to the low occurrence of tools in the midden context, a chi-square test comparing the raw material proximity types would not be valid.



Pueblo de la Mesa Tools: Site

Tables 8.44 and 8.45 display the completeness factor corrected frequencies of the curation levels by raw material type and raw material proximity type for the tools from the entire site, respectively. Figures 8.23 and 8.24 illustrate the completeness factor

Table 8.44: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Type for Pueblo de la Mesa Tools

Note: Mtn. Chert = Mountainair Chert, Chal. = Chalcedony

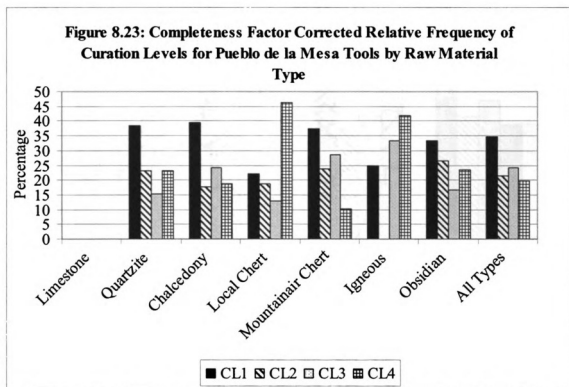
	Limestone	Quartzite	Chal.	Local Chert	Mtn. Chert	Igneous	Obsidian	All Types
CL1	0	1	9.8	5.2	26.8	0.6	2	45.4
CL2	0	0.6	4.4	4.4	17	0	1.6	28
CL3	0	0.4	6	3	20.4	0.8	1	31.6
CL4	0	0.6	4.6	10.9	7.3	1	1.4	25.8
Sum	0	2.6	24.8	23.5	71.5	2.4	6	130.8

Table 8.45: Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Proximity Type for Pueblo de la Mesa Tools

	Local	Near-Local	Non-Local	All Types
CL1	16	26.8	2.6	45.4
CL2	9.4	17	1.6	28
CL3	9.4	20.4	1.8	31.6
CL4	16.1	7.3	2.4	25.8
Sum	50.9	71.5	8.4	130.8

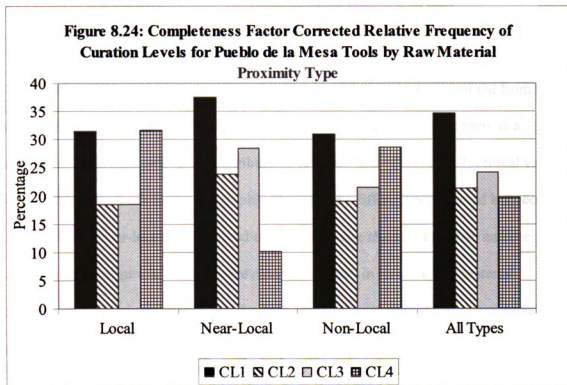
corrected relative frequency of the tool curation levels by raw material type and raw material proximity type, respectively. Nearly all of the raw material types used to manufacture tools at Pueblo de la Mesa have the full range of tool curation classes represented, suggesting that there were no strong patterns of tool specialization behaviors associated with any single raw material type. For quartzite, chalcedony, Mountainair Chert, and obsidian the lightly curated CL1 tools were the most common. This pattern indicates that the principal use of these raw material types was for tasks that involved little or no curation behaviors. That is not to say that this was the only use for these raw

material types, which also have significant proportions of the heavily curated CL3 and CL4 tools. The high proportion of CL4 tools for the local chert and igneous materials stands out in contrast to the other stone types at the site. Since projectile points were by far the most common CL4 tool type, this pattern indicates that these raw materials were favored for projectile point manufacture. Much like the other raw materials, local chert and igneous also had significant proportions of lightly curated tools, indicating that they too were broadly utilized at the site.



The raw material proximity type data illustrated in Figure 8.24 indicates that the overall tool utilization/deposition of local and non-local materials were similar. Both have high proportions of CL1 and CL4 tools, with lesser amounts of the CL2 and CL3 tools. This is interesting, since these curation levels represent opposite ends of the tool curation spectrum. In contrast the near-local tools are primarily CL1, CL2, and CL3,

with CL4 constituting the smallest proportion of the total. The disparate use of the near-local materials compared to the local and non-local materials suggests that proximity from the site and/or the inherent stone qualities (predicable fracture, and hardness) may have structured some of the lithic technological choices at the site. The high proportion of CL4 tools for both the local and non-local raw materials indicates that distance from



the site was not the primary factor in structuring the technological decision making. Site wide the most common tool curation level was CL1 (35%), with all of the other tool curation levels between 20% and 25% of the total. The majority of the tools at the site would be considered expedient (CL1 and CL2) in most tool curation studies, which is consistent with other pueblo sites in the Southwest (Parry and Kelly 1987; Young and Harry 1989).

Table 8.46: Chi-Square Comparison of the Completeness Factor Corrected Frequency of Tool Curation Levels by Raw Material Proximity Type for Pueblo de la Mesa Tools ($\chi^2 = 8.82$, $\alpha = 0.05$, $df = 3$, critical value = 7.815)			
	Local	Near-Local	Non-Local
CL1	16 (18.1)	26.8 (24.9)	NA
CL2	9.4 (11.4)	17 (15.6)	NA
CL3	9.4 (13.0)	20.4 (18)	NA
CL4	16.1 (10.5)	7.3 (14.5)	NA

Table 8.46 presents the chi-square comparison of the tool curation levels among the raw material proximity types at the site. The non-local tools were omitted from the test due to small sample size ($N=8.4$). The chi-square test indicates that there is a significant difference among the distributions ($\chi^2 = 8.82$, $\alpha = 0.05$, $df = 3$, critical value = 7.815). This result reinforces the graphically apparent differences observed between the local tools and near-local tools. Based on the chi-square test in Table 8.46 and the distributions in Figure 8.24 there were clear differences in how the raw material proximity types were utilized at Pueblo de la Mesa. Specifically, local raw materials were more often utilized for the maximally curated CL4 tools, while the near-local raw materials were more often used for lightly curated tools (CL1 and CL2) and CL3 tools. However, both the local and near-local tool distributions spanned the range of tool curation levels, indicating that while there were some raw material proximity type-specific tool curation behaviors there was not definitive specialization associated with any one raw material proximity type.

Pueblo de la Mesa Discussion

A number of the general observations concerning the Frank's Ruin lithic assemblage are also broadly applicable for Pueblo de la Mesa. At both sites there were a

number of statistically valid differences among the depositional contexts and among the raw material proximity types within the depositional contexts. This indicates that location within the pueblo as well as raw material type were important factors in structuring artifact deposition and curation decisions. There was also a lack of perfect correspondence between the interpretations of the debitage cortex cover and size class data for a number of raw material proximity types and depositional contexts, which further underscores the importance of using multiple lines of evidence when approaching a complex, multifaceted problem. In Chapter 9 the Frank's Ruin and Pueblo de la Mesa assemblages are compared to each other, allowing for an evaluation of their overall degree of similarity in the organization of lithic technology.

Chapter 9: Frank's Ruin and Pueblo de la Mesa Inter-Site Comparison

Introduction

In this chapter the assemblages from Frank's Ruin and Pueblo de la Mesa are compared to evaluate how similar the organization of lithic technology was at the sites. The data discussed in the intra-site analyses (Chapters 7 and 8) form the basis for the inter-site assessments, offering numerous and diverse points of comparison. One major benefit of the highly detailed intra-site analyses is that they provide the context for the inter-site comparisons. That is, the level of variation exhibited within a site helps us better understand the range and intensity of variation to expect when two sites are compared. Throughout these inter-site analyses, the results of the Frank's Ruin and Pueblo de la Mesa intra-site analyses are referenced in order to contextualize apparent differences (or similarities) observed between the sites.

In order to provide for statistically valid chi-square tests and maintain a comparable level of precision with the intra-site analyses, the raw material proximity types and the depositional contexts are the principal analytical dimensions utilized for the inter-site analyses. The order of the analyses proceeds in the same manner as the intra-site analyses, starting with the two debitage variables, followed by the core and tool curation level variables. Within each of the artifact types the two sites are compared across the depositional contexts (e.g. rooms to rooms, midden to midden, etc.). Since all of the data used to calculate the chi-square and Fisher's exact tests for these comparisons are provided in the intra-site analyses, summary tables are used to present the results in lieu of providing dozens of contingency tables. It is worth reiterating that the null

hypothesis for all of these comparisons is that there will be no significant difference between the sites.

The starkly different abandonment processes at Frank's Ruin and Pueblo de la Mesa present a problem for the inter-site comparisons. A number of Southwestern archaeologists (*cf.* Cameron 1990; Diehl 1998) have pointed out that the mode of abandonment (e.g. catastrophic, gradual, etc.) can have an appreciable impact on the types and quantities of stone tools deposited at sites, especially regarding artifact assemblages in the most "active" areas of sites (i.e. rooms). In recognition of this, this study applies a hierarchy to the utility of the inter-site depositional context comparisons based on logical predictions of which areas of the pueblos would be the most affected by abandonment processes. The midden and site-wide (i.e. all contexts together) comparisons are considered to be the most robust, followed by the plaza comparisons, with the room comparisons as the least reliable inter-site measurement of similarity.

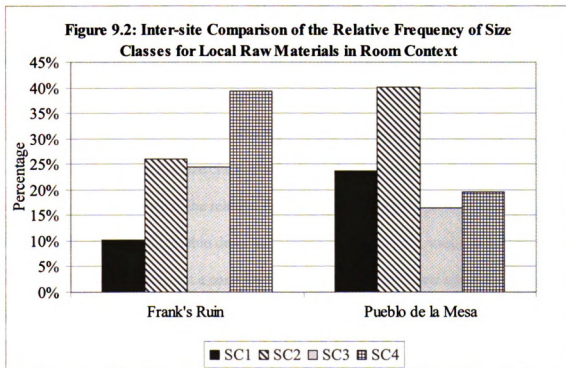
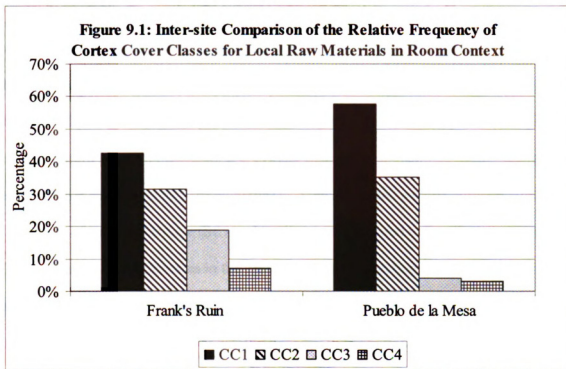
Inter-Site Debitage: Local Raw Materials from Room Contexts

Table 9.1 summarizes the debitage chi-square comparisons between Frank's Ruin and Pueblo de la Mesa for the local raw material proximity type. In Table 9.1 there are a number of chi-square comparisons with significant differences for the local raw materials. This is true for both of the debitage variables in the room context. Figure 9.1 illustrates the relative frequency of the cortex cover classes for the local debitage from room context at both sites. Compared to Frank's Ruin, Pueblo de la Mesa has a greater proportion of non-cortical debitage (CC1) and lower proportions of flakes with greater dorsal cortex cover (CC3 and CC4). Based on Figure 9.1 it seems that there was more early stage reduction of local raw materials in the room context at Frank's Ruin. This

conclusion is supported by the relative frequency of the size classes illustrated in Figure 9.2. At Frank's Ruin there is a substantially higher relative frequency of large debitage (SC3 and SC4), with correspondingly lower proportions of smaller debitage (SC1 and SC2). The higher proportion of large debitage in the Frank's Ruin rooms is suggestive of comparatively more early stage reduction.

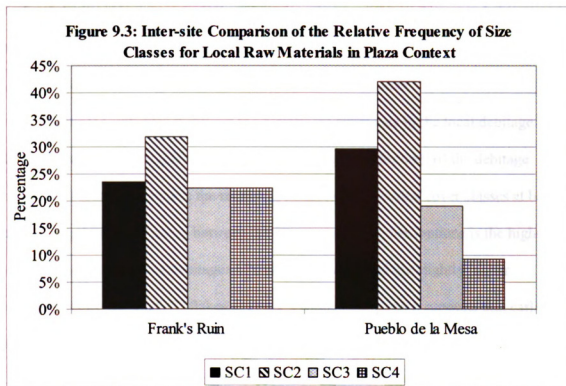
Table 9.1: Summary Table for the Chi-Square Comparisons between Frank's Ruin and Pueblo de la Mesa Local Debitage				
	<i>df</i>	Critical Value ($\alpha = 0.05$)	χ^2	Significant
Room Cortex Cover	3	7.815	14.043	Yes
Room Size Class	3	7.815	18.303	Yes
Plaza Cortex Cover	3	7.815	1.525	No
Plaza Size Class	3	7.815	9.303	Yes
Midden Cortex Cover	3	7.815	5.646	No
Midden Size Class	3	7.815	4.814	No
Site Cortex Cover	3	7.815	15.439	Yes
Site Size Class	3	7.815	35.639	Yes

It is difficult to determine if the "cause" of these parallel results is related to the variable abandonment processes at the two sites or if there were technological/behavioral differences in how the local stones in the room contexts were utilized. A further complicating factor for interpreting these results is the higher relative frequency of limestone debitage at Frank's Ruin (44%) compared to Pueblo de la Mesa (12%). As has already been discussed, limestone has a much higher average package size than the other local raw material types, which likely increased the frequency of large limestone debitage. As noted for both of the intra-site discussions, limestone typically had a cortex cover distribution that was similar to the other local raw materials. Since there is also a significant difference for the cortex cover variable in this context the higher frequency of limestone at Frank's Ruin is clearly not solely responsible for the significant differences observed between the two sites.



Inter-Site Debitage: Local Raw Materials from Plaza Contexts

Table 9.1 indicates that there is not a significant difference between the cortex cover distributions, but there was a significant difference between the size class distributions for the localdebitage from plaza context at the two pueblos. Figure 9.3 illustrates the relative frequency of the size classes for the localdebitage from the plaza context at both sites. In Figure 9.3 it is evident that the local materials from Frank's Ruin have a higher proportion of largedebitage (SC3 and SC4) and a correspondingly lower proportion of smallerdebitage (SC1 and SC2), when compared to Pueblo de la Mesa. This trend indicates differences in the primary mode of reduction between the plaza contexts, with relatively more early stage reduction at Frank's Ruin. It is interesting that this difference in reduction mode was not detected in the cortex cover distributions. However, there were a number of instances in the intra-site comparisons when the size class chi-square comparisons detected significant differences and the cortex cover variable did not. As already mentioned, this suggests an imperfect correspondence between how the two variables "respond" to variation in reduction stages. This also indicates that the size class variable may be more "sensitive", or alternately less robust (i.e. demonstrates more random variability), than the cortex cover variable. The significant difference in the size class distributions observed between the two sites is particularly interesting since the relative frequencies of limestonedebitage were similar at Frank's Ruin (7%) and Pueblo de la Mesa (9%). Consequently, inequitable relative limestone frequencies was not a contributing factor to the significant size class chi-square result, as may have been the case in the room context.



Inter-Site Debitage: Local Raw Materials from Midden Contexts

Table 9.1 indicates that there is not a significant difference in the midden context local debitage distributions between Frank's Ruin and Pueblo de la Mesa for either of the debitage variables. These results are noteworthy since the utilization of the midden context remained stable at both sites throughout their occupations, which was not the case for the other depositional contexts (especially rooms). Therefore, the midden context is perhaps the best point of comparison of the sites' individual depositional contexts because it would be the least sensitive to the complicating factor of variable abandonment processes and the undoubtedly mixed midden assemblages are likely representative of the "average" use of local materials at the sites. If this is the case, the local midden debitage chi-square comparisons present persuasive evidence for relatively equitable use of the local raw materials. At the very least, these results present an interesting counterpoint to

the local debitage comparisons from the room and plaza contexts (discussed above) and the site-wide comparisons (discussed below).

Inter-Site Debitage: Local Raw Materials from the Sites

Table 9.1 indicates that there is a significant difference in the local debitage distributions between Frank's Ruin and Pueblo de la Mesa for both of the debitage variables. Figure 9.4 displays the relative frequency of the cortex cover classes at both sites. The primary difference between the two cortex cover distributions is the higher proportion of non-cortical debitage at Pueblo de la Mesa and the slightly higher proportions of CC2 and CC3 flakes at Frank's Ruin. This pattern suggests that earlier stages of reduction were more common at Frank's Ruin than at Pueblo de la Mesa. This conclusion is supported by the relative frequency size class data illustrated in Figure 9.5.

In Figure 9.5 the primary difference between the distributions is the much higher proportions of smaller debitage (SC1 and SC2) at Pueblo de la Mesa, with correspondingly lower proportions of larger debitage (SC3 and SC4). Since the debitage from earlier stages of reduction are typically larger than the debitage from later stages, it is clear that overall the Frank's Ruin local debitage derives from earlier stages of reduction. Similar to the room context, there is a higher overall proportion of limestone debitage at Frank's Ruin (25%) than at Pueblo de la Mesa (12%), which could influence the significance of the size class chi-square test but is likely not a contributing factor in the significance of the cortex cover chi-square test. Even when considering the confounding affects of limestone's large average package size, the results from the site-wide comparison present sufficient evidence to suggest that there was a substantial difference between how local raw materials were utilized at the sites. Behaviorally this

Figure 9.4: Inter-site Comparison of the Relative Frequency of Cortex Cover Classes for Local Raw Materials

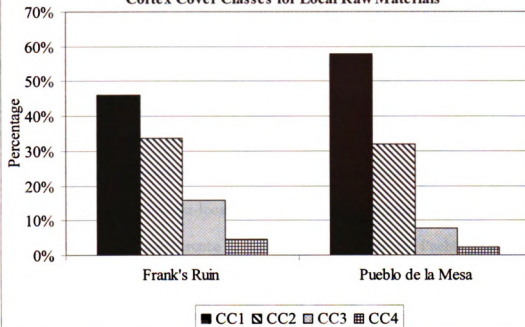
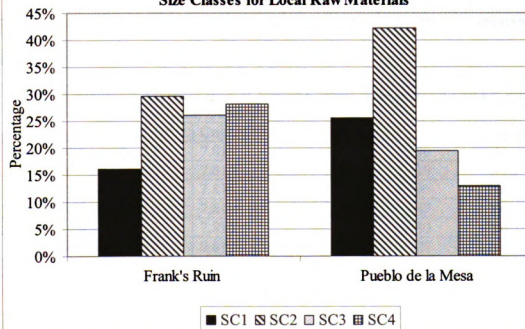


Figure 9.5: Inter-site Comparison of the Relative Frequency of Size Classes for Local Raw Materials



difference could be reflective of more expedient use of the local raw materials at Frank's Ruin resulting in more early stage debitage, compared to a pattern of local raw material utilization for more heavily curated tools at Pueblo de la Mesa resulting in more late stage debitage. The inter-site comparison of the local raw material tools should provide an interesting test of this hypothesis.

Inter-Site Debitage: Near-Local Raw Materials from Room Contexts

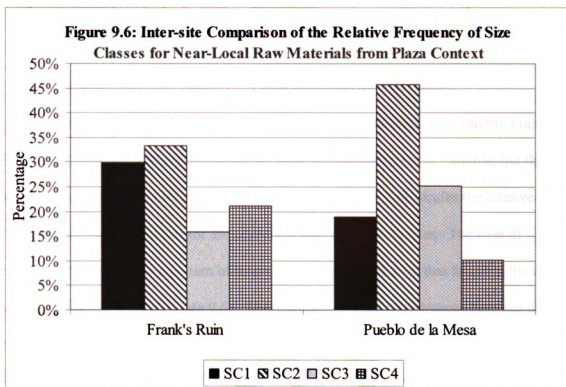
Table 9.2 summarizes the debitage chi-square comparisons between Frank's Ruin and Pueblo de la Mesa for the near-local raw material proximity type. Table 9.2 indicates that there is not a significant difference between the Frank's Ruin and Pueblo de la Mesa near-local room debitage for either the cortex cover or size class variable. These results are particularly notable given the significant differences identified for the local debitage from room context for both variables (see above). The near-local raw material proximity type consists of a single raw material type (Mountainair Chert) and therefore does not have the problem of commingled stone varieties with different qualities (i.e. average package size) inherent in the local raw material proximity type, which is comprised of limestone, quartzite, chalcedony, and local chert. In short,

Table 9.2: Summary Table for the Chi-Square Comparisons between Frank's Ruin and Pueblo de la Mesa Near-Local Debitage				
Test	Df	Critical Value ($\alpha = 0.05$)	χ^2	Significant
Room Cortex Cover	3	7.815	5.230	No
Room Size Class	3	7.815	2.419	No
Plaza Cortex Cover	3	7.815	3.796	No
Plaza Size Class	3	7.815	9.747	Yes
Midden Cortex Cover	3	7.815	1.080	No
Midden Size Class	3	7.815	6.827	No
Site Cortex Cover	3	7.815	7.093	No
Site Size Class	3	7.815	13.248	Yes

variability in the frequencies of particular raw material types does not skew the data for the near-local materials. As a consequence of the monolithic nature of the near-local raw material type the interpretation of the chi-square comparisons between the sites is considerably simplified. In the case of the room debitage, there is unequivocal evidence indicating similar reduction behaviors. This conclusion suggests that the differences in abandonment processes were not a factor in structuring the deposition of the near-local debitage in the room context.

Inter-Site Debitage: Near-Local Raw Materials from Plaza Contexts

Table 9.2 indicates that there is not a significant difference between the Frank's Ruin and Pueblo de la Mesa near-local plaza context debitage for the cortex cover variable, but there is a significant difference for the size class variable. Figure 9.6 illustrates the relative frequency of the plaza context debitage size classes for both sites. There is considerable discordance between the distributions in every size class. Pueblo de la Mesa has higher proportions of flakes in the SC2 and SC3 classes and lower proportions in the SC1 and SC4 classes. The lack of clear "directionality" to the differences manifest in Figure 9.6 suggests that both debitage populations have a high degree of assemblage mixing. The relatively high proportion of SC1 and SC4 flakes for the Frank's Ruin debitage indicate that there was a mix of early and late stage reduction, resulting in substantial representation of the smallest (SC1) and largest (SC4) size classes. The relatively high proportions of SC2 and SC3 flakes for Pueblo de la Mesa suggest that early and late stage reduction, as well as considerable quantities of middle stage reduction, were all components to the overall reduction strategy. In sum, both debitage populations indicate a degree of assemblage mixing, but the proportional



importance of the various reduction stages was dissimilar. Unfortunately the lack of a significant difference for the cortex cover variable makes it difficult to draw more definitive interpretations of the near-local plaza context debitage.

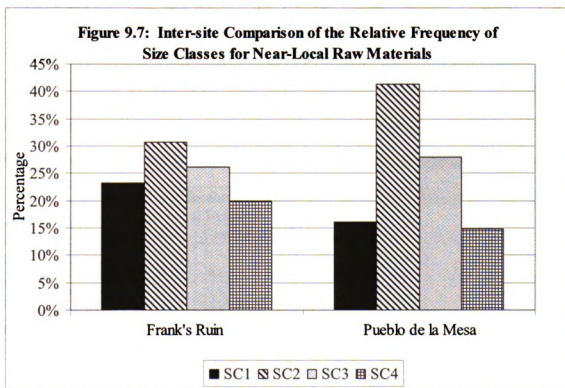
Inter-Site Debitage: Near-Local Raw Materials from Midden Contexts

Table 9.2 indicates that there is not a significant difference between the Frank's Ruin and Pueblo de la Mesa near-local midden debitage for the cortex cover and size class variables. These results parallel the local midden chi-square tests, which also found no significant differences between the sites. If the supposition that midden contexts contain mixed assemblages that are not overly influenced by the differential abandonment processes between the sites is correct, we may interpret the lack of significant chi-square tests as indicative of relatively consistent utilization of the near-

local raw materials at both sites. However, the site-wide near-local debitage comparisons discussed below indicate that there may have been some differences between the sites

Inter-Site Debitage: Near-Local Raw Materials from the Sites

Table 9.2 indicates that there is not a significant difference between the Frank's Ruin and Pueblo de la Mesa near-local debitage for the cortex cover variable, but there is a significant difference for the size class variable. Figure 9.7 illustrates the relative frequency of the size classes for the near-local debitage at both sites. The overall size class distributions show a pattern of discordance that is similar to that found in the near-local plaza debitage (see Figure 9.6). There are considerable differences between the relative frequencies for every size class. Frank's Ruin has a higher proportion of SC1 and SC4 debitage, and Pueblo de la Mesa has higher proportions of SC2 and SC3 flakes.



Much like the interpretation of the near-local plaza debitage, it appears that both assemblages exhibit a high degree of assemblage mixing, which is to be expected for a site-wide comparison. It appears that much of the Frank's Ruin near-local debitage is a combination of mostly early stage and mostly late stage reduction. In contrast, the Pueblo de la Mesa near-local debitage has lighter representation of the two reduction extremes; instead the size class data indicate that middle stages of reduction were the most common. Based on these interpretations we would expect that the Frank's Ruin near-local tools would be primarily lightly curated (CL1) and maximally curated tools (CL4), and the Pueblo de la Mesa tools would comprise of mostly tools from the middle two curation levels (CL2 and CL3).

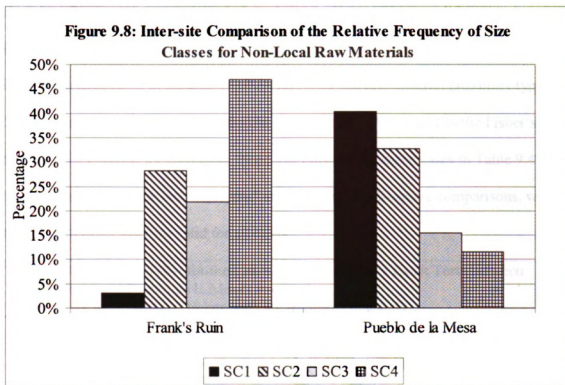
Inter-Site Debitage: Non-Local Raw Materials from the Sites

Table 9.3 summarizes the chi-square comparisons between the Frank's Ruin and Pueblo de la Mesa debitage for the non-local raw material proximity type. Overall the non-local raw material proximity type had low representation at both Frank's Ruin (N=15) and Pueblo de la Mesa (N=52). As a result, the chi-square tests of the debitage variables between the sites across each depositional context do not meet the requisite frequencies for a statistically valid comparison. The highest resolution available for valid

Table 9.3: Summary Table for the Chi-Square Comparisons between Frank's Ruin and Pueblo de la Mesa Non-Local Debitage				
Test	<i>df</i>	Critical Value ($\alpha = 0.05$)	χ^2	Significant
Room Cortex Cover	NA	NA	NA	Not Valid
Room Size Class	NA	NA	NA	Not Valid
Plaza Cortex Cover	NA	NA	NA	Not Valid
Plaza Size Class	NA	NA	NA	Not Valid
Midden Cortex Cover	NA	NA	NA	Not Valid
Midden Size Class	NA	NA	NA	Not Valid
Site Cortex Cover	3	7.815	5.594	No
Site Size Class	3	7.815	20.995	Yes

chi-square tests is the site-wide level. Table 9.3 indicates that there is not a significant difference between the site-wide non-local debitage for the cortex cover variable, but there is a significant difference for the size class variable. Figure 9.8 illustrates the relative frequency of the non-local size classes at Frank's Ruin and Pueblo de la Mesa. There is a marked dissimilarity between the two distributions, with much lower proportions of SC1 and SC2 flakes at Frank's Ruin and much lower proportions of SC3 and SC4 debitage at Pueblo de la Mesa. The clear directional differences between the sites displayed in Figure 9.8 indicates that the non-local raw materials were utilized for more early stage reduction at Frank's Ruin and more late stage reduction at Pueblo de la Mesa.

One contributing factor to the apparently acute disparity between the sites is the much higher relative frequency of obsidian at Pueblo de la Mesa (53%) compared to Frank's Ruin (3%). As noted in Chapter 4, the average package size for the obsidian is the smallest of all of the raw material types in this study. Along with stage of reduction, the average raw material package size is an important factor in structuring the size distributions for debitage. Since a large proportion of Pueblo de la Mesa non-local debitage is comprised of obsidian and the average package size of obsidian is quite small, it is not surprising that there is an apparently dramatic difference between the two sites' non-local size distributions. The lack of average package size information for the igneous raw material type, which constitutes the remainder of the non-local stone at both sites, makes it difficult to affirm that the different size class distributions is due to variability in mode of reduction alone. A cursory inspection of the size class distributions for the site-wide igneous debitage at Frank's Ruin (see Figure 7.16) and at



Pueblo de la Mesa (Figure 8.16) indicates that there is a much higher proportion of larger debitage (SC3 and SC4) at Frank's Ruin, which does suggest significant differences in reduction between the sites. Keeping the obsidian average package size caveat in mind, the expectations for the non-local core and tool comparisons at the two sites is for lightly curated tools (CL1 and CL2) at Frank's Ruin and more heavily curated tools (CL3 and CL4) at Pueblo de la Mesa.

Inter-Site Core Curation Level Comparison

Compared to debitage and tools, cores have the lowest frequency of all of the artifact types analyzed in this study. The completeness factor corrected core frequency for Frank's Ruin is only 42.4, and at Pueblo de la Mesa it is 55. As a result of this low overall frequency, most of the chi-square comparisons of the core curation levels between the depositional contexts by raw material proximity type were invalid because the test's

minimum frequencies were not met. In order to make statistically valid comparisons, Fisher's exact tests were utilized. Table 9.4 displays a contingency table of all of the inter-site comparisons of the core curation levels for the raw material proximity types by depositional context. In Table 9.4 the chi-square test results, as well as the Fisher's exact test results are shown for each case. Note that only the italicized cases in Table 9.4 (i.e. local site, near-local site, and "all types" site) have valid chi-square comparisons, while the Fisher's exact tests are valid for all cases.

Table 9.4: Summary Table for the Chi-Square and Fisher's Exact Tests between Frank's Ruin and Pueblo de la Mesa Core						
Note: Cases with valid chi-square tests are <i>italicized and bold</i> .						
Raw Material Proximity Type and Depositional Context	χ^2 <i>df</i>	χ^2 Critical Value ($\alpha = 0.05$)	X^2	χ^2 Significance	Fisher's Exact <i>p-value</i> (two-tail)	Fisher's Exact Significance
Local Room	1	3.814	0.024	No	1.0	No
Local Plaza	1	3.814	0.686	No	0.57	No
Local Midden	1	3.814	0.375	No	0.59	No
<i>Local Site</i>	<i>1</i>	<i>3.814</i>	<i>0.120</i>	<i>No</i>	<i>0.74</i>	<i>No</i>
Near-Local Room	1	3.814	0.607	No	0.68	No
Near-Local Plaza	1	3.814	0.096	No	1.0	No
Near-Local Midden	1	3.814	2.400	No	0.45	No
<i>Near-Local Site</i>	<i>1</i>	<i>3.814</i>	<i>2.074</i>	<i>No</i>	<i>0.24</i>	<i>No</i>
Non-Local Room	NA	NA	NA	No	1.0	No
Non-Local Plaza	NA	NA	NA	No	1.0	No
Non-Local Midden	NA	NA	NA	No	1.0	No
Non-Local Site	1	3.814	0.833	No	1.0	No
<i>All Types Site</i>	<i>1</i>	<i>3.814</i>	<i>0.286</i>	<i>No</i>	<i>0.68</i>	<i>No</i>

Table 9.4 indicates that for every raw material proximity type and depositional context permutation the chi-square and the Fisher's exact tests indicate that there is not a significant difference between the sites. These results are remarkable given the thirteen

points of comparison between the two sites. One can only conclude from Table 9.4 that the raw material proximity types were used in a spatially consistent manner at both sites.

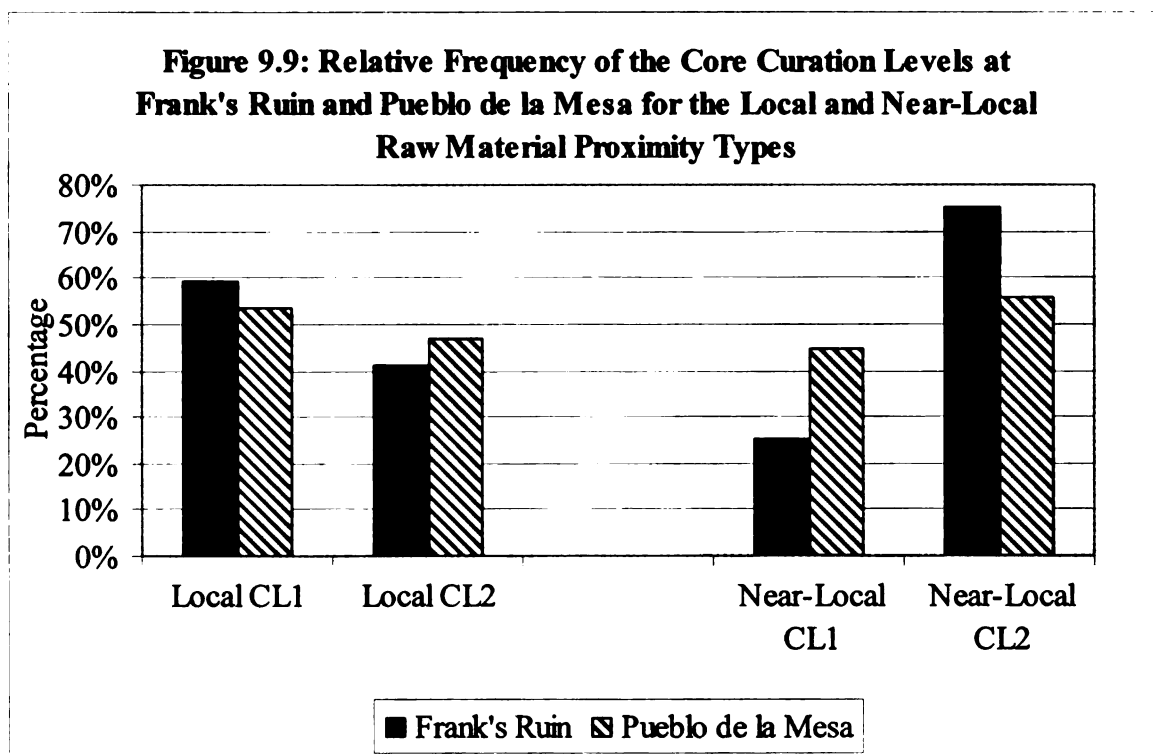


Figure 9.9 illustrates the relative frequency of the core curation levels for the local and near-local raw material proximity types for both sites' cores. Non-local cores were omitted from Figure 9.9 due to low frequencies at Frank's Ruin (N=1) and at Pueblo de la Mesa (N=4). One outstanding feature of Figure 9.9 is the difference in core curation levels between the local and near-local stone types. At both sites there is a higher proportion of CL1 cores for the local materials and a higher proportion of CL2 cores for the near-local materials. These trends not only provide graphical substantiation of the chi-square and Fisher's exact test results, they also indicate an apparent differentiation of core reduction strategies for the local and near-local stone types that was consistent at both sites. Behaviorally this indicates that local cores were more often deposited as

nearly exhausted bipolar cores (i.e. CL1) rather than as cores with ostensibly more “utility” (i.e. the CL2, unidirectional and multidirectional cores).

If the relationship between bipolar reduction and remaining core utility are the same at these sites as has been observed in numerous prehistoric (Amick 2007; Kelly 1988) and ethnographic examples, then we may conclude that local raw materials were used more intensively than non-local and near-local materials at Frank’s Ruin and Pueblo de la Mesa. As a corollary to this proposition it would seem that near-local cores were used less intensively and deposited while there was still some utility remaining. Utility that could have been realized with further bipolar reduction. If these arguments characterize the actual core reduction behavior(s) the most parsimonious explanation for the data is that local raw materials (especially quartzite, chalcedony, and local chert) were of a higher quality for a number of tasks, which necessitated the reduction of local cores to exhaustion (i.e. bipolar reduction). This deduction could be supported by the tool data if the local raw materials were more frequently utilized for highly curated tools at both sites, since it has been documented that stone quality plays an important role in tool curation and use (Andrefsky 1994).

Inter-Site Tool Comparisons

The tool curation level comparisons provide the best direct test of the overall degree of similarity in the organization of lithic technology between Frank’s Ruin and Pueblo de la Mesa. The debitage analyses provide proxy measures of the degree of reduction exhibited by particular raw material proximity types within a given context, which can then be used to make inferences about tool manufacture. Unfortunately there are a number of factors (i.e. average package size differences, variability in initial cortex

cover amounts, assemblage mixing) that make it difficult to formulate concise, affirmative statements about the organization of lithic technology using debitage alone. Along with providing a set of expectations for the tool analyses (i.e. curation levels for particular raw material proximity types), the debitage analyses offer useful supporting evidence for the overall degree of similarity between the sites, but they do not measure the technological phenomena (i.e. curation behaviors) directly. The same can be said of the core curation level data, which provide supplementary measures of the degree of similarity between the sites. As a result, the tool curation level comparisons provide the best and most direct test of the central question of this study.

In these inter-site analyses of the tool curation levels three separate, but complementary resolutions of comparison are employed. The highest resolution utilizes chi-square tests to compare the tool curation levels for the raw material proximity types across each of the depositional contexts between the sites. The lack of large tool samples from both sites prevents many of these chi-square tests from being statistically valid. In order to provide statistically valid comparisons a lower resolution assessment groups the tool curation levels (CL1-CL4) into either “expedient” tools (CL1 and CL2) or “curated” tools (CL3 and CL4). In these inter-site evaluations, the Fisher’s exact test is used to compare the raw material proximity types across the depositional contexts between the sites. This lower resolution comparison is more inline with the traditional approaches to tool curation level analysis (Andrefsky 1994; Bamforth 1986; Young and Harry 1989). A third level of resolution groups all of the raw material types within each depositional context together to test whether there are significant differences in the total tool curation levels between the depositional contexts at the sites (e.g. Frank’s Ruin rooms compared

to Pueblo de la Mesa rooms). Considered together, these three levels of tool analysis provide for multiple points of comparison between the sites, allowing for robust statements about the overall degree of similarity.

Inter-Site Tool Comparison: Local Raw Materials

Table 9.5 is a summary of the chi-square comparisons of the Frank's Ruin and Pueblo de la Mesa tool curation levels across the depositional contexts for the local raw materials. Table 9.6 is a summary of the Fisher's exact tests of the condensed expedient and curated tool frequencies for the same comparisons as Table 9.5. In both tables there are no significant differences detected for any of the depositional contexts, including the site-wide comparison. The lack of significant difference for either level of resolution indicates that the local raw materials were utilized in a spatially consistent manner at both sites. These results are quite interesting for the room contexts comparisons in particular because they indicate that the tool curation level distributions were apparently unaffected by the differential abandonment processes. Instead, the tool curation levels in the catastrophically abandoned Frank's Ruin rooms are indistinguishable from the gradually abandoned Pueblo de la Mesa rooms. Considered together, Tables 9.5 and 9.6 suggest that the technological behaviors structuring the use/deposition of local raw materials at the sites were essentially identical, or at the very least the net affects of these behaviors were identical.

Table 9.5: Summary Table of the Chi-Square Comparisons of Tool Curation Levels between Frank's Ruin and Pueblo de la Mesa for Local Raw Materials					
Depositional Context	Df	Critical Value ($\alpha = 0.05$)	χ^2	Significant	Notes
Room	3	7.815	0.037	No	Not Valid
Plaza	3	7.815	1.320	No	Not Valid
Midden	3	7.815	2.85	No	Not Valid
Site	3	7.815	0.64	No	Valid

Table 9.6: Summary Table of the Fisher's Exact Test Comparing the Expedient and Curated Tool Frequencies between Frank's Ruin and Pueblo de la Mesa for Local Raw Materials

Depositional Context	Fisher's Exact <i>p</i> -value (two-tailed)	Fisher's Exact Significance
Room	1	No
Plaza	0.67	No
Midden	0.60	No
Site	0.64	No

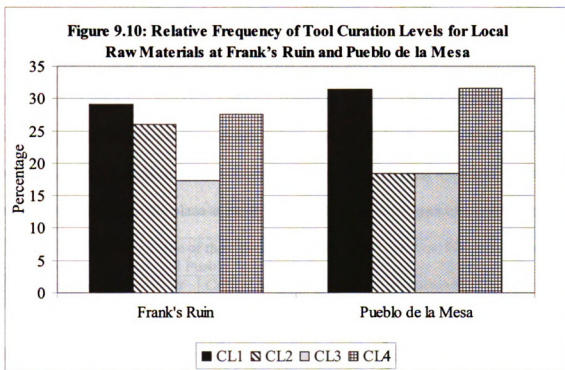


Figure 9.10 illustrates the relative frequency of the tool curation levels for the Frank's Ruin and Pueblo de la Mesa local raw material tools. There is a clear similarity between the two sites in Figure 9.10, with the higher proportion of CL2 tools at Frank's Ruin as the only notable difference. This difference is interesting given the higher relative frequency of early stage debitage at Frank's Ruin, which may be a result of more expedient use of this raw material at the site.

Inter-Site Tool Comparison: Near-Local Raw Materials

Table 9.7 is a summary of the chi-square comparisons of the Frank's Ruin and Pueblo de al Mesa tool curation levels across the depositional contexts for the near-local raw materials. Table 9.8 is a summary of the Fisher's exact tests of the condensed expedient and curated tool frequencies for the same comparisons as Table 9.7. The chi-square and Fisher's exact tests indicate that there is not a significant difference between the sites for all of the depositional contexts except the plaza context.

Figure 9.11 illustrates the relative frequency of the tool curation levels for the near-local tools from plaza context. At Frank's Ruin there was a much higher relative frequency of expedient tools (CL1 and CL2) than at Pueblo de la Mesa. This difference is largely responsible for the significant Fisher's exact test result. Since a similar pattern was not observed for the local and non-local raw materials in plaza context it is difficult to support that overall the plaza at Frank's Ruin was used in an appreciably different

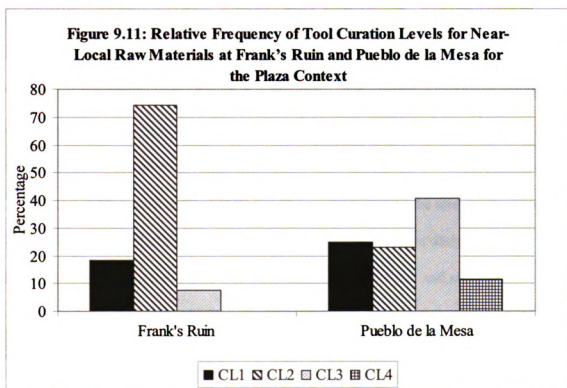
Table 9.7: Summary Table of the Chi-Square Comparisons of Tool Curation Levels between Frank's Ruin and Pueblo de la Mesa for Near-Local Raw Materials

Depositional Context	<i>df</i>	Critical Value ($\alpha = 0.05$)	χ^2	Significant	Notes
Room	3	7.815	1.30	No	Not Valid
Plaza	3	7.815	5.98	No	Not Valid
Midden	3	7.815	3.22	No	Not Valid
Site	3	7.815	3.96	No	Valid

Table 9.8: Summary Table of the Fisher's Exact Test Comparing the Expedient and Curated Tool Frequencies between Frank's Ruin and Pueblo de la Mesa for Near-Local Raw Materials

Depositional Context	Fisher's Exact <i>p-value</i> (two-tailed)	Fisher's Exact Significance
Room	1	No
Plaza	0.04	Yes
Midden	0.37	No
Site	0.18	No

manner than at Pueblo de la Mesa. Nevertheless, this significant result does add texture to the inter-site tool comparison, even if behavioral or technological explanations for this difference remain elusive. Perhaps a more detailed examination of the morpho-functional tool types that comprise the plaza near-local tool assemblages could provide the data necessary to expand on the nature of this difference, and possibly identify activity-specific dissimilarities between the sites. The advantage of the detailed, but relatively coarse resolution of this study is that these incongruities may be identified, providing a starting point for subsequent research targeting these divergences for explanation. Excluding the plaza comparisons, it is clear that as a whole near-local raw materials were used/deposited in similar manners at both sites.



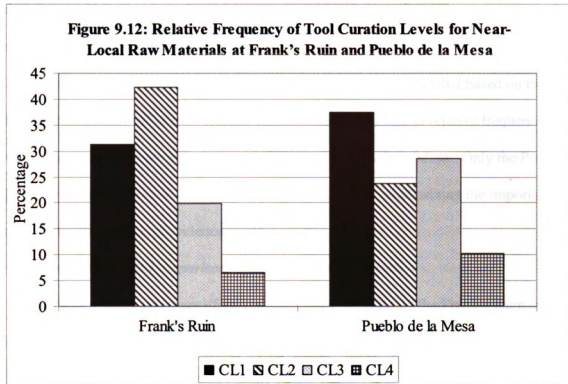


Figure 9.12 illustrates the relative frequency of the tool curation levels for the near-local tools at Frank's Ruin and Pueblo de la Mesa. As is evident in Figure 9.12 the two distributions are relatively similar, apart from for the slightly lower proportion of CL1, CL3 and CL4 tools at Frank's Ruin. The expectations for the tool curation level distributions based off of the near-local debitage comparisons (see above) were not met. The prediction was for more CL1 and CL4 tools at Frank's Ruin, and more CL2 and CL3 tools at Pueblo de la Mesa, which is clearly not the case. One explanation for this discordance is the debitage assemblages at the sites are not directly reflective of the tool types deposited at the sites. In other words, some of the tools made at the sites were deposited in other locations and/or some of the tools manufactured elsewhere were deposited at the sites. This probable scenario underscores the importance of using

multiple lines of evidence to understand the organization of lithic technology at sites, since no single artifact type (i.e. debitage, cores, or tools) can characterize the range of behaviors represented in lithic assemblages. Along the same lines, the expectations for the tool curation levels for the local and near-local materials formulated based on the core data are inconclusive (see above). The expectation was for higher relative frequencies of highly curated local tools at both Frank's Ruin and Pueblo de la Mesa. Only the Pueblo de la Mesa tools corresponded with this prediction, further emphasizing the importance of using multiple lines of evidence in lithic studies.

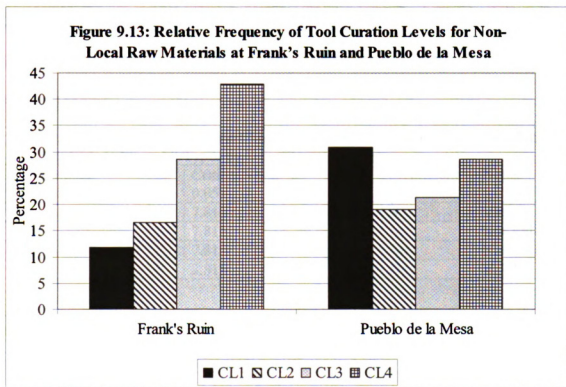
Inter-Site Tool Comparison: Non-Local Raw Materials

Table 9.9 is a summary of the chi-square comparisons of the Frank's Ruin and Pueblo de la Mesa tool curation levels across the depositional contexts for non-local raw materials. Table 9.10 is a summary of the Fisher's exact tests of the condensed expedient and curated tool frequencies for the same comparisons as Table 9.9. Both tables indicate that there is not a significant difference in tool curation levels between the two sites, at any level of comparison. It is worth noting that due to small sample sizes none of the chi-square tests are valid. However, all of the Fisher's exact tests are valid, which suggests that non-local raw materials were used in a spatially consistent manner at both sites.

Table 9.9: Summary Table of the Chi-Square Comparisons of Tool Curation Levels between Frank's Ruin and Pueblo de la Mesa for Non-Local Materials					
Depositional Context	<i>df</i>	Critical Value ($\alpha = 0.05$)	χ^2	Significant	Notes
Room	3	7.815	1.589	No	Not Valid
Plaza	3	7.815	1.28	No	Not Valid
Midden	3	7.815	2.92	No	Not Valid
Site	3	7.815	1.34	No	Not Valid

Table 9.10: Summary Table of the Fisher's Exact Test Comparing the Expedient and Curated Tool Frequencies between Frank's Ruin and Pueblo de la Mesa for Non-Local Raw Materials		
Depositional Context	Fisher's Exact <i>p</i> -value (two-tailed)	Fisher's Exact Significance
Room	1	No
Plaza	1	No
Midden	1	No
Site	0.64	No

Figure 9.13 illustrates the relative frequency of the tool curation levels for the non-local raw materials at Frank's Ruin and Pueblo de la Mesa. There is a considerable dissimilarity between the two distributions in Figure 9.13, with much higher proportions



of CL3 and CL4 tools at Frank's Ruin compared to the more even distribution at Pueblo de la Mesa. The predictions for the sites' non-local tool assemblages based the debitage assemblages were not met. At Frank's Ruin it was predicted that there would be a higher frequency of non-local CL3 and CL4 tools, which is exactly the opposite of the actual

distribution. Since the reduction/manufacture of non-local tools likely occurred off-site, it is entirely reasonable that there is an imperfect correspondence between the on-site debitage and the tools recovered at the sites.

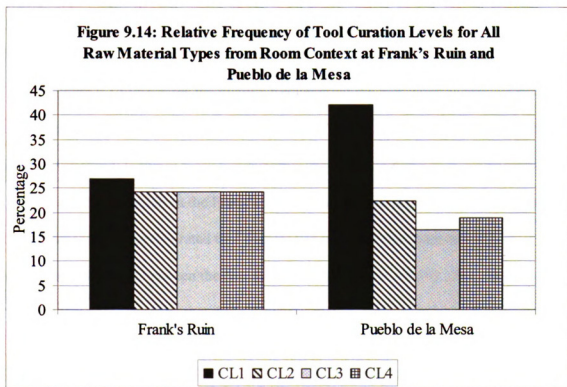
Inter-Site Tool Comparison: Depositional Context

Table 9.11 is a summary of the chi-square comparisons of the Frank's Ruin and Pueblo de la Mesa tool curation levels across the depositional contexts for all raw material types grouped together. Table 9.12 is a summary of the Fisher's exact tests of the condensed expedient and curated tool frequencies for the same comparisons as Table 9.11. In every case for Tables 9.11 and 9.12 there is no significant difference between Frank's Ruin and Pueblo de la Mesa. All of these results indicate that the organization of lithic technology, as evidenced by the tool curation level data, was remarkably consistent between the sites.

Table 9.11: Summary Table for the Chi-Square Comparisons between Frank's Ruin and Pueblo de la Mesa All Types by Depositional Context					
Depositional Context	<i>df</i>	Critical Value ($\alpha = 0.05$)	χ^2	Significant	Notes
Room	3	7.815	2.17	No	Valid
Plaza	3	7.815	4.14	No	Not Valid
Midden	3	7.815	2.18	No	Not Valid
Site	3	7.815	3.19	No	Valid

Table 9.12: Summary Table of the Fisher's Exact Test Comparing the Expedient and Curated Tool Frequencies between the Frank's Ruin and Pueblo de la Mesa Depositional Contexts for All Raw Material Types		
Depositional Context	Fisher's Exact <i>p-value</i> (two-tailed)	Fisher's Exact Significance
Room	0.28	No
Plaza	0.09	No
Midden	0.48	No
Site	0.64	No

Figure 9.14 illustrates the relative frequency of the tool curation levels for all of the raw material types from room context at Frank's Ruin and Pueblo de la Mesa. Except for the higher proportion of CL1 tools at Pueblo de la Mesa, both of the distributions display relatively even representation of all of the tool curation levels. The chi-square and Fisher's exact test for this comparison indicate that there is not a significant difference between the two distributions. This finding is comparable to the results from the individual raw material proximity types, which further highlights the surprising consistency of the room tool assemblages despite the drastically different abandonment processes.



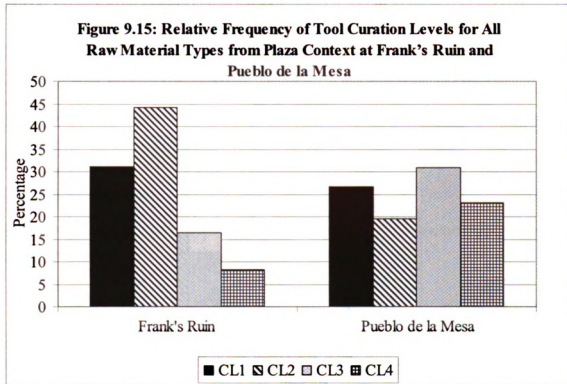
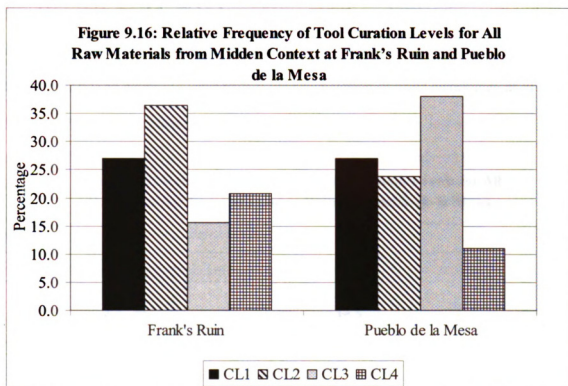


Figure 9.15 illustrates the relative frequency of the tool curation levels for all of the raw material types from plaza context at Frank's Ruin and Pueblo de la Mesa. There is some variability between these two distributions, with a notably higher proportion of the CL1 and CL2 tools from the Frank's Ruin plaza. The Fisher's exact test comparing the condensed expedient/curated tool frequencies indicates that there is nearly a significant difference between the two distributions ($p\text{-value} = 0.09$). This nearly significant $p\text{-value}$ suggests that there may have been some real behavioral differences in the use/deposition of stone tools in this context.

Figure 9.16 illustrates the relative frequency of the tool curation levels for all of the raw material types from the midden context at Frank's Ruin and Pueblo de la Mesa.

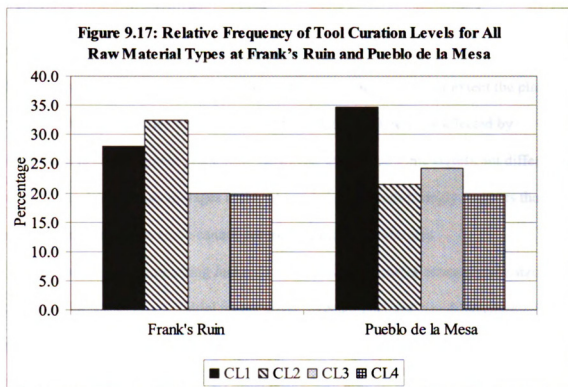
The primary difference between these two distributions is the higher proportion of CL2 tools at Frank's Ruin and the higher proportion of CL3 tools at Pueblo de la Mesa.



The Fisher's exact tests indicate that there is not a significant difference between the condensed expedient/curated tool frequencies. The lack of differentiation between the midden contexts is not unexpected since the contents of these contexts are the discarded tools from their respective sites and the site-wide tool curation level distributions are quite similar (see below).

Figure 9.17 illustrates the relative frequency of the tool curation levels for all of the raw material types at Frank's Ruin and Pueblo de la Mesa. Overall, both distributions have a high degree of similarity, with the only appreciable difference being the higher proportion of CL1 tools at Pueblo de la Mesa and the higher proportion of CL2 tools at Frank's Ruin. This greater emphasis on less curated tools parallels the widely observed

paucity of highly curated tools in semi-sedentary/sedentary societies in general (Jeske 1992; Parry and Kelly 1987), and in the Southwest specifically (Young and Harry 1989). The chi-square test and the Fisher's exact test both indicate that there is not a significant difference between the two curation level distributions, offering a convincing testament to the overall high degree of similarity in the organization of lithic technology at Frank's Ruin and Pueblo de la Mesa.



Inter-Site Comparison Discussion

The site-wide, all raw material type tool curation level comparison provides the single best indicator of the striking similarities in the organization of lithic technology between the sites. This comparison offers a robust measure because differences in tool frequencies due to differences in abandonment processes are minimized at this coarse

level of resolution. Furthermore, the high degree of similarity between the sites is supported by nearly every other point of comparison pursued for the tool and core data.

The debitage analyses, which offer a less direct measure of tool and core, use, manufacture, and deposition, exhibited a higher degree of dissimilarity between the sites. These differences, which were frequent enough to warrant serious consideration, provide an interesting counterpoint to the consistency of the tool and core use/deposition behaviors between the sites. There clearly were significant differences in how the raw materials, especially the local raw materials, were reduced at these sites. Spatially these differences were most pronounced in the room context and to a lesser extent the plaza context, which are the two depositional contexts that would be most affected by differences in abandonment processes. However, there were some significant differences between the debitage assemblages at the site-wide level which strongly suggests that abandonment processes alone cannot account for the dissimilarities.

Despite the complicating factors noted for both the cortex cover and the size class variables (i.e. variability in initial cortex cover, average package size differences, assemblage mixing), I contend that there were real technological differences in how stone was reduced at the sites. However, these technological differences, while pronounced in the debitage data, were not due to substantive differences in lithic raw material utilization strategies or substantial behavioral differences in the range and intensity of tool and core use (i.e. the organization of lithic technology). In other words, I argue that the debitage variables are much more “sensitive” to minor variations in reduction behaviors that are real, but that do not directly correspond to the level of comparison that is the central question of this study. That is not to say that the debitage variable analyses were useless,

in fact far from it, but they generally appear to be too sensitive to minor variations in reduction strategies to provide for concise, definitive statements about the overall degree of similarity in the organization of lithic technology.

Based on the preponderance of evidence, drawing particularly from the direct measures of tool curation, there is unmistakable evidence for a high degree of similarity in the organization of lithic technology between the sites. Outside of the debitage, core, and tool variables that were the central subject of this research there were a number of differences between the sites distinguished during the general descriptions of the overall raw material use and artifact density at the beginning of this chapter that bear discussing.

There are statistically significant differences between the frequencies of raw material types (see Table 6.10) and raw material proximity types (see Table 6.15 and 6.16) between the sites. As has been discussed, these pronounced differences were largely due to the higher relative frequencies of obsidian and Mountainair Chert at Pueblo de la Mesa and the higher relative frequencies of limestone at Frank's Ruin. The differences in limestone utilization are interesting since limestone was directly available at both sites, and in high quantities. It is unclear if the higher frequency of limestone use at Frank's Ruin was due to a local preference for limestone for certain tasks, a higher quality limestone source at the site, or restricted accesses to higher quality raw materials. The much greater utilization of obsidian at Pueblo de la Mesa provides circumstantial evidence suggesting that there may have been some important differences in the access to extra-local exchange networks and/or direct procurement opportunities, in favor of Pueblo de la Mesa. The higher relative frequency of the near-local Mountainair Chert at Pueblo de la Mesa lends some supporting evidence to this proposition, although

Mountainair Chert was also used in high frequencies at Frank's Ruin. Considered together, there do seem to be some important differences in the access/utilization of the raw material types at the sites, which is one important component to the organization of lithic technology. Whatever the cause for the raw material relative frequency differences, it seems that the raw materials, once procured, were utilized in similar manners at both sites.

The other major difference observed between the sites is the dramatic incongruity in artifact density, which is over an order of magnitude larger in some depositional contexts at Pueblo de la Mesa (see Table 6.2). Based on the similarities observed between the sites there is little indication that the differences in artifact density were due to meaningful behavioral/technological differences (i.e. differences in kind), but were instead due to the longer occupation of Pueblo de la Mesa which facilitated denser artifact deposits (i.e. differences in degree).

Chapter 10: Conclusion

The central objective of this thesis was to compare the degree of similarity in the organization of the lithic technology at two Early Masonry/Early Late Masonry Period pueblos in the Salinas region. Through a comparison of stone tool procurement, manufacture, use, and discard strategies we can infer how similar the cultural and environmental factors that structure the organization of lithic technology were at Frank's Ruin and Pueblo de la Mesa.

In Chapter 3, the high degree of similarity between the sites' size, function, environmental setting, location, temporal period, and architectural layout were outlined. Due to the pervasiveness of similitude between the sites, the null hypothesis in this study was that there would be no significant differences observed in the lithic assemblages. The primary occupational differences identified between the sites were the mode of abandonment and length of occupation. The albatross of this study was to distinguish between differences in the lithic assemblages due to the mode of abandonment and/or length of occupation, and those differences that were due to substantive variability in chipped stone tool utilization strategies.

The analyses of the three chipped stone artifact types (i.e. debitage, cores, and tools) involved different measures of tool curation, which is one of the best understood and most analytically useful components of the organization of lithic technology (Nelson 1991). There were a number of differences detected between the debitage assemblages at Frank's Ruin and Pueblo de la Mesa, both in how raw material proximity types were utilized at the sites in general, as well as differences between the reduction strategies evident in specific depositional contexts. Notably, there was not perfect "agreement"

concerning the interpretation of the two debitage variables analyzed (cortex cover and size class) in all cases, which indicates that these two commonly used measures respond in uneven manners to variation in reduction strategies. Further complicating the interpretation of the debitage assemblages were differences among, and within the raw material proximity types in average package size, amount of initial cortex cover, as well as the omnipresent challenge in debitage studies of assemblage mixing.

The inter-site core and tool analyses, however, indicated an exceptionally high degree of similarity in the range, intensity, and spatial distribution of tool curation behaviors. Since the core and tool analyses provide a more direct measure of tool curation than the debitage analyses, the variation noted between the debitage assemblages was difficult to explain in light of the core and tool data. One explanation for the differences identified in the inter-site debitage analyses is that they do reflect real variability in the utilization/reduction of the raw material proximity types, but the statistically significant debitage differences are not directly representative of significant differences in the tool curation behaviors. That is, the two debitage variables (especially size class) are “sensitive” to subtle variations in core and tool utilization/reduction that are not readily apparent in the core and tool measures of curation. The preponderance of results indicated statistically indistinguishable core and tool assemblages for nearly every point of comparison between the sites, signifying that for the most direct measures of curation behaviors there are essentially no differences between Frank’s Ruin and Pueblo de la Mesa.

Interestingly there were not significant differences in the tool and core data between the room contexts at the sites, which (one would think) is the depositional

context that would be the most affected by differences in abandonment mode. This result is counter-intuitive. This lack of difference indicates that the measures of tool curation are general enough to remain useful despite dramatic differences in abandonment. Another real possibility is that the affects of the catastrophic abandonment of Frank's Ruin and the gradual abandonment of Pueblo de la Mesa on the room artifact assemblages were essentially the same. A third possibility is that our current understanding of the abandonment processes at Pueblo de la Mesa is incomplete, or more complex than is currently appreciated. In particular, the results of this study suggest that a reexamination of the Pueblo de la Mesa reports and field records may be worth while. Some of the rooms at Pueblo de la Mesa did show signs of fire reddening on the masonry walls (Rautman 1992, 1993). In addition, the field crew also recorded the presence of broken, but unfired ceramic vessels apparently *in situ* on the floor of one room. The cultural deposits and artifact assemblages present in these rooms should be restudied to investigate whether, in fact, some individual rooms may have been hastily abandoned.

Beyond the curation level measures for the debitage, cores, and tools, there were some significant differences between the sites in the relative frequency of raw material utilization, including the more frequent use of obsidian and Mountainair Chert at Pueblo de la Mesa and the much higher utilization of limestone at Frank's Ruin. These raw material asymmetries indicate that there were some differences in the procurement of lithic raw materials, which could be rooted in social and/or economic differences in the access to exchange networks and direct procurement opportunities. However, these differences were not necessarily reflected in the utilization/curation of the raw material types once these raw materials were procured.

Perhaps the most striking discrepancy between the sites was the much higher artifact density at Pueblo de la Mesa in every depositional context. Based on the compositional similarity between the sites it is clear that this difference is not the result of systematic differences in the organization of the lithic technology between the sites. Rather, this difference is undoubtedly the product of the longer occupation span at Pueblo de la Mesa and the utilization of some of the abandoned rooms as middens during the later periods of occupation at the site. The loss of some Frank's Ruin midden artifacts downslope, and as a result out of the excavated area, due to erosion could have also contributed to the remarkably "thin" deposits in this context.

Within the broader context of Salinas prehistory, the high degree of similarity in the organization of lithic technology at Frank's Ruin and Pueblo de la Mesa has interesting implications. Foremost is that there does not seem to be a high level of differentiation among the pueblos in the Jumanos cluster area during the period before the development of the cluster. During the period after the occupation of Frank's Ruin and Pueblo de la Mesa, when the large Jumanos cluster pueblos were occupied (post A.D. 1400), there have been some archaeologically observed disparities in the range and intensity of extra-local exchange networks. Specifically, there were differences observed in the quantities of long distance trade goods such as obsidian, bison meat and hides, and glaze ware ceramics at Gran Quivira, Pueblo Colorado, and Pueblo Blanco (Graves 2004, 2005; Graves and Spielmann 2000). These pueblos, based on proximity alone, were likely occupied by the descendants of Frank's Ruin (Gran Quivira or Pueblo Pardo) and Pueblo de la Mesa (Pueblo Colorado or Pueblo Blanco). Graves (2004) interprets these material disparities among the protohistoric Jumanos pueblos as indicating intra-cluster

differences in power and prestige. Based on the overall lack of differentiation between the two pueblos in this study, it seems that inter-site differentiation had not yet developed prior to the Jumanos cluster genesis, at least regarding the organization of lithic technology.

It should be noted that measures of tool curation are probably quite robust, and are likely not to show significant variation between archaeological sites unless there were marked differences in the access to lithic sources, mobility strategies, or tool function requirements related to variable economic strategies. It is precisely this robustness of tool curation measures that make them an especially useful type of archaeological lithic analysis. However, this robustness also makes it difficult to register subtle differences between sites that may have interpretive value.

In studying the inter-site differentiation within the pre-Jumanos cluster pueblos there are many angles beyond the methods employed in this study through which this important topic in Salinas prehistory may be approached. There were a number of variables recorded for the debitage, including flake completeness, initiation type, termination type, platform flake scar count, and dorsal flake scar count that were not analyzed in this study but are included in Appendices D and G (see Appendix A for coding explanation) that certainly contain useful information for further studies concerning lithic reduction at the sites. Likewise, many of the variables recorded for the stone tools and projectile points (see Appendices E, F, H, and I for data, and Appendices B and C for coding explanation), especially regarding the extent and invasiveness of retouch, could lend further insight into the intensity of curation for specific tool types, raw material types, and depositional contexts. Finally, applying a cluster analysis to the

morpho-functional tool types would provide a powerful means of assessing how similar the tool assemblages are for the various raw material proximity types and depositional context groupings, allowing for a supplementary evaluation of the similarity in the organization of lithic technology between the sites.

Beyond the data immediately available in this volume, there are other avenues of research that would greatly improve the depth and breadth of the knowledge of Salinas region lithic technology. Foremost is a survey of the region's tool stone sources, providing a description of the location, quantity, and character of lithic sources. The interpretation of the debitage assemblages in this research would be much improved by higher resolution raw material source data. Likewise, systematic reduction experiments utilizing local stone varieties would raise the interpretive value of the archaeological debitage studies by providing analog assemblages from which to make comparisons and test expectations. The higher relative frequency of obsidian at Pueblo de la Mesa hints at some incipient differentiation among the pre-Jumanos pueblos in the access to long distance exchange networks. Subsequent obsidian sourcing studies of the Frank's Ruin and Pueblo de la Mesa obsidian collections would be a fruitful line of inquiry for better understanding how, and from where, the pueblos procured obsidian. Outside of lithic analysis, a petrographic study of the ceramic assemblages at Frank's Ruin and Pueblo de la Mesa would provide an interesting independent test of the degree of similarity in the range, direction, and intensity of the intra- and extra-local ceramic exchange and procurement networks.

The degree and character of social, political, and economic differentiation among the early pueblos in the Jumanos cluster area is a fascinating and important topic not just

for Salinas prehistory, but for many regions of the Southwest in which settlement clusters typified the late prehistoric periods. How and why these settlement clusters form, why they persist (or fail), and how the settlement clusters differ, are topics that will be at the forefront of Southwestern archaeology for decades to come. This research offers a useful test of the degree of similarity in the organization of lithic technology at two pre-Jumanos cluster sites, which provides a starting point for better understanding these processes in the Salinas region.

LIBRARY
Michigan State
University

PLACE IN RETURN BOX to remove this checkout from your record.
TO AVOID FINES return on or before date due.
MAY BE RECALLED with earlier due date if requested.

DATE DUE	DATE DUE	DATE DUE

A COMPARISON OF THE ORGANIZATION OF LITHIC TECHNOLOGY AT TWO
PREHISTORIC PUEBLOS IN CENTRAL NEW MEXICO

VOLUME II

By

Jacob Edward Foss

A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements for
the degree of

MASTER OF ARTS

Anthropology

2009

APPENDICES

APPENDIX A

Debitage Variable Definitions

Note: Definitions are presented in the same order as they appear in both the debitage coding sheet and the spreadsheets of the recorded debitage data.

Note: The abbreviations of the variable names are included in brackets.

1) Bag Number [Bag]

The bag number is unique to the particular excavation unit, level, and artifact type in question. A group of artifacts of the same type (e.g. debitage) from the same excavation unit and level should share the same bag number, unless they were excavated at different times.

2) Lot Number [Lot]

The lot number is unique to the excavation unit and level in question, regardless of artifact type.

3) Artifact Number [Art.]

The artifact number is unique to the specific artifact in question, within a single artifact type (e.g. debitage). These numbers were assigned sequentially in the order that each of the artifacts was analyzed.

4) General Provenience [Pv.]

The general provenience refers to the groups of excavation units from different areas within and around the pueblo.

Table A.1: Frank's Ruin (LA-9032) Excavation Units		
Provenience Code	Provenience Name	Excavation Units Within Provenience
1	Area A	(492E,489N), (493E, 492N), (494E, 492N)
2	Area B	(489E, 511N), (490E, 511N), (491E, 511N), (486E, 511N)
3	Area C	(498E, 514N), (499E, 514N), (500E, 514N), (498E, 515N) (499E, 515N), (500E, 515N)
4	Area D	(517E, 492N), (517E, 495N), (518E, 494N), (519E, 496N), (516E, 496N)
5	Area E	(506E, 486N), (508E, 486N), (506E, 487N), (505E, 485N), (505E, 484N), (505E, 483N)
6	Pothunter Pit 1	(503E, 515N)
7	Pothunter Pit 2	(484E, 495N), (484E, 493N)
8	Pothunter Pit 3	(498E, 503N)
9	Pothunter Pit 4	Not excavated
10	Midden 1	(510E, 522N)
11	Midden 2	(525E, 513N), (524E, 513N), (524E, 514N)

Table A.1 (cont'd)		
12	Midden 3	(476E, 495N)

Table A.2: Pueblo de la Mesa (LA-2091) Excavations Units		
Provenience Code	Provenience Name	Excavation Units Within Provenience
1	North Plaza (Upper Plaza)	(515E, 531N), (507E, 537N), (507E, 541N)
2	South Plaza (Lower Plaza)	(540E, 500N), (517E, 496N), (518E, 496N)
3	Kiva 1	Not in Sample
4	Kiva 2	Not in Sample
5	Northwest Midden	Two Units not on Grid
6	Southwest Midden	Two Units not on Grid
7	West Midden	Not in Sample
8	Room 1	Not in Sample
9	Room 3	Not in Sample
10	Room 4	(516E, 506N), (517N, 507N)
11	Room 5	(521E, 536N)
12	Room 6	Not in Sample
13	Room 7	Not in Sample
14	Room 8	Not in Sample
15	Roomblock V	Not in Sample

5) Structure Number [St.]

The structure number refers to the numbered room in which the excavation unit is located.

6) Feature Number [Ft.]

The feature number refers to the numbered feature in which the excavated level is located.

7) Raw Material [R.M.]

The raw material type refers to the type of stone from which the artifact was made.

Table A.3: Raw Material Types	
Raw Material Code	Raw Material Type
1	Chert (includes a wide variety of non-crystalline forms of different textures)

Table A.3 (cont'd)	
2	Chalcedony
3	Quartzite (large crystal faces, rough texture)
4	Limestone
5	Sandstone
6	Felsic igneous (light coloration)
7	Mafic igneous (dark coloration)
8	Obsidian
9	Siltstone
10	Petrified wood
11	Recycled groundstone, limestone
12	Quartzite (small crystal faces)
13	Gypsum
14	Pipestone
15	Quartz Crystal
16	Mica
99	Unknown

8) Color [Cl.]

The color refers to the predominate, non-cortical, color of the stone from which the artifact was made.

Table A.4: Stone Colors	
Color Code	Color
1	Clear
2	White (Mountainair chert)
3	Gray
4	Black or dark gray
5	Brown or caramel color
6	Purple
7	Reddish
8	Orange
9	Yellow-Amber
10	Greenish, yellow-green
11	Pink
12	Beige or tan
15	Peach
16	Dark brown
17	Red-orange
18	Maroon
19	White (non-Mountainair)
20	Heat-treated Mountainair (white, glassy)
21	Tan limestone
22	Burnt, cannot tell original color

Table A.4 (cont'd)	
23	Maroon-clear (chalcedony)
24	Greenish-brown
30	Opaque black obsidian
31	Clear black obsidian
32	Mafic, black-orange mottled
33	Red/tan mottled

9) Artifact Type [AT]

Artifact type refers to the functional or morphological “type” class in which the artifact belongs. In the case of debitage all of the artifact types should be coded as either “1” (unmodified flake) or “90” (shatter).

10) Condition [C.]

The condition of the artifact refers to the completeness of the flake.

Table A.5: Flake Condition	
Condition Code	Condition
1	Intact- All elements of the flake are present including the platform, propagation, clearly defined dorsal and ventral faces, the lateral margins, and termination.
3	Proximal/Medial- Platform is intact but the termination is missing.
4	Medial- Platform and termination are missing, leaving only the middle par of the flake.
5	Medial/Distal- The middle portion of the flake and the termination are intact, only the platform is missing.
7	Halving Break- All of the elements of an intact flake are present, but the flake has split longitudinally.
9	Shatter- These are flakes with no single identifiable release surface (i.e. ventral face) and without an identifiable platform or termination.

11) Type of Flake (Old) [FTO]

The type of flake (old) refers to the morphological flake “type”. The flake types used for this variable are a “hold over” of previous debitage analyses conducted in the Salinas Region. As such, this variable was recorded to allow for comparability between the Franks Ruin collection and other sites excavated in the vicinity.

Table A.6: Type of Flake (Old)	
Flake Type (Old) Code	Flake Type (Old)
1	Bifacial reduction flake (small platform, diffuse bulb, dorsal side has many multi-directional flake scars)

Table A.6 (cont'd)	
2	Bipolar flake reduction (flake scars on dorsal side from two directions with crushing)
3	Platform bearing flake
4	Non-platform bearing flake (but can distinguish dorsal and ventral sides)
5	Shatter (cannot distinguish dorsal and ventral sides)
88	Non-identifiable
99	Non-applicable (includes non-flake lithic tools)

12) Flake Cortex [Cr.]

The flake cortex variable refers to the proportion of the dorsal surface of the flake that is covered by cortex, which is defined as the weathered outer surface of a piece of stone.

Table A.7: Dorsal Cortex Cover	
Flake Cortex Code	Percentage of Dorsal Surface with Cortex
1	0
2	1-50
3	51-99
4	100
5	Not applicable

13) Flake Platform Scar Count [PS]

The flake platform scar count refers to the number of flake scars (negative impressions left by removed flakes) larger than 3mm (in any dimension) on the flake platform.

14) Flake Dorsal Scar Count [DS]

The flake dorsal scar count refers to the number of flake scars (negative impressions left by removed flakes) larger than 3mm (in any dimension) on the dorsal surface of the flake.

15) Initiation Type [In.]

The initiation type refers to the type of flake initiation that is evident on the ventral surface of the flake based on the morphology of the surface immediately below the platform.

Table A.8: Initiation Type	
Initiation Type Code	Initiation Type
1	Shear- Lack of bulb of force or “platform lipping” due to a wedging initiation, which gives the appearance of a sheared flake removal.
2	Bend- “Platform lipping” caused by the bending of the flake away from the point of applied force.
3	Cone- Bulb of force below the platform due to the conchoidal fracture of the stone at the point of applied force.
NA	Not applicable

16) Termination Type [Ter.]

The termination type refers to the type of flake termination based on the morphology of the flake termination.

Table A.9: Termination Type	
Termination Type Code	Termination Type
1	Feather- Smooth, gradual termination of the flake.
2	Step- Abrupt termination of the flake perpendicular to the direction of the flake removal force.
3	Hinge- Abrupt termination of the flake, caused by the “rolling” of the flake removal force away from the objective piece.
4	Outré passé (also called “Plunging”) - A “reverse hinge fracture” caused by the flake removal force “rolling” towards the objective piece.
NA	Not applicable

17) Type of Flake (New) [FTN]

The flake type (new) refers to the morphological flake “type.” The flake types recorded for this variable include a wider array of types with clearer definitions than the flake type (old) variable (see above).

Table A.10: Type of Flake (New)	
Type of Flake (New) Code	Type of Flake (New)
1	Bifacial reduction flake- Flake with “lipped platform”, bend initiation, significant flake curvature, many multidirectional dorsal flake scars, and a feather termination (if flake is complete).
2	Bipolar reduction flake- Flake with crushing on both ends, may also have sheared initiations on either (or both) end(s).
3	Blade reduction flake- Flake that is at least twice as long as it is thick with a prominent ridge down the center of the dorsal side of the flake indicating purposeful blade core preparation.
4	Multidirectional core reduction- Thick flake with many multidirectional flake scars on the dorsal surface indicating that it derived from a multidirectional core.
5	Unidirectional core reduction- Thick flake with many unidirectional flake scars on the dorsal surface indicating that it derived from a unidirectional core.
6	Scraper retouch flake- Flake with a heavily lipped platform, a broad platform angle, and some evidence of scraper usewear at the intersection of the platform and dorsal surface.
7	Notching flake- Flake with the distinctive half-cone shaped profile and feathered termination that is the result of notching a stone tool.
8	Fluting flake- A long, narrow flake with a central ridge along its dorsal surface formed by deliberate preparation through bifacial thinning.
9	Pressure flake- A small, elongated flake with a bend initiation and many flake scars on the dorsal surface.
10	General retouch- A general tool resharpening flake with many flake scars on the platform and dorsal surfaces, significant flake curvature, usewear at the intersection of the platform and dorsal surfaces, and feather termination.
11	Shatter- A flake without a single ventral surface and no clear flake initiation point.
88	Indeterminate- Unable to place flake in the above flake categories.

18) Size of Flake [LD]

The size of the flake is the length of the largest axis in millimeters. This variable was measured in 5mm intervals so a flake that is coded as “15” is larger than 10mm and smaller than 15mm.

19) Weight of Object [W]

The weight of the flake was measured to the nearest .1 g.

20) Provenience East [E]

The provenience east refers to the easterly coordinate of the excavation unit.

21) Provenience North [N]

The provenience north refers to the northerly coordinate of the excavation unit.

22) Level [L]

Level refers to the depth (in levels) of the excavation unit

APPENDIX B

Stone Tool Variable Definitions

Note: Definitions are presented in the same order as they appear in both the stone tool coding sheet and the spreadsheets of the recorded stone tool data.

Note: The abbreviations of the variable names are included in brackets.

1) Bag Number [Bag#]

The bag number is unique to the particular excavation unit, level, and artifact type in question. A group of artifacts of the same type (e.g. stone tools) from the same excavation unit and level should share the same bag number, unless they were excavated at different times.

2) Lot Number [Lot#]

The lot number is unique to the excavation unit and level in question, regardless of artifact type.

3) Artifact Number [Art.#]

The artifact number is unique to the specific artifact in question, within a single artifact type (e.g. stone tools). These numbers were assigned sequentially in the order that each of the artifacts was analyzed.

4) General Provenience [Prov.]

The general provenience refers to the groups of excavation units from different areas within and around the pueblo.

Table B.1: Frank's Ruin (LA-9032) Excavation Units		
Provenience Code	Provenience Name	Excavation Units Within Provenience
1	Area A	(492E,489N), (493E, 492N), (494E, 492N)
2	Area B	(489E, 511N), (490E, 511N), (491E, 511N), (486E, 511N)
3	Area C	(498E, 514N), (499E, 514N), (500E, 514N), (498E, 515N) (499E, 515N), (500E, 515N)
4	Area D	(517E, 492N), (517E, 495N), (518E, 494N), (519E, 496N), (516E, 496N)
5	Area E	(506E, 486N), (508E, 486N), (506E, 487N), (505E, 485N), (505E, 484N), (505E, 483N)

Table B.1 (cont'd)		
6	Pothunter Pit 1	(503E, 515N)
7	Pothunter Pit 2	(484E, 495N), (484E, 493N)
8	Pothunter Pit 3	(498E, 503N)
9	Pothunter Pit 4	Not excavated
10	Midden 1	(510E, 522N)
11	Midden 2	(525E, 513N), (524E, 513N), (524E, 514N)
12	Midden 3	(476E, 495N)

Table B.2: Pueblo de la Mesa (LA-2091) Excavation Units		
Provenience Code	Provenience Name	Excavation Units Within Provenience
1	North Plaza (Upper Plaza)	(515E, 531N), (507E, 537N), (507E, 541N)
2	South Plaza (Lower Plaza)	(540E, 500N), (517E, 496N), (518E, 496N)
3	Kiva 1	Not in Sample
4	Kiva 2	Not in Sample
5	Northwest Midden	Two Units not on Grid
6	Southwest Midden	Two Units not on Grid
7	West Midden	Not in Sample
8	Room 1	Not in Sample
9	Room 3	Not in Sample
10	Room 4	(516E, 506N), (517N, 507N)
11	Room 5	(521E, 536N)
12	Room 6	Not in Sample
13	Room 7	Not in Sample
14	Room 8	Not in Sample
15	Roomblock V	Not in Sample

5) Structure Number [St.#]

The structure number refers to the numbered room in which the excavation unit is located.

6) Feature Number [Ft.]

The feature number refers to the numbered feature in which the excavated level is located.

7) Raw Material [R.M.]

The raw material type refers to the type of stone from which the artifact was made.

Table B.3: Raw Material Types	
Raw Material Code	Raw Material Type
1	Chert (includes a wide variety of non-crystalline forms of different textures)
2	Chalcedony
3	Quartzite (large crystal faces, rough texture)
4	Limestone
5	Sandstone
6	Felsic igneous (light coloration)
7	Mafic igneous (dark coloration)
8	Obsidian
9	Siltstone
10	Petrified wood
11	Recycled groundstone, limestone
12	Quartzite (small crystal faces)
13	Gypsum
14	Pipestone
15	Quartz Crystal
16	Mica
99	Unknown

8) Color [Col.]

The color refers to the predominate, non-cortical, color of the stone from which the artifact was made.

Table B.4: Stone Colors	
Color Code	Color
1	Clear
2	White (Mountainair chert)
3	Gray
4	Black or dark gray
5	Brown or caramel color
6	Purple
7	Reddish
8	Orange
9	Yellow-Amber
10	Greenish, yellow-green
11	Pink
12	Beige or tan
15	Peach
16	Dark brown

Table B.4 (cont'd)	
17	Red-orange
18	Maroon
19	White (non-Mountainair)
20	Heat-treated Mountainair (white, glassy)
21	Tan limestone
22	Burnt, cannot tell original color
23	Maroon-clear (chalcedony)
24	Greenish-brown
30	Opaque black obsidian
31	Clear black obsidian
32	Mafic, black-orange mottled
33	Red/tan mottled

9) Artifact Type [AT]

Artifact type refers to the morphological or functional “type” of the artifact.

Table B.5: Artifact Type	
Artifact Type Code	Artifact Type
1	Unmodified flake (debitage).
2.1	Utilized flake with evidence of use on a single face of a margin.
2.2	Utilized flake with evidence of use on two faces, in the same place on the same margin.
2.3	Utilized flake with evidence of use on two faces, in different places on the same margin.
2.4	Utilized flake with evidence of use on a single face of two margins.
2.5	Utilized flake with evidence of use on two faces of two margins, in the same place on those margins.
2.6	Utilized flake with evidence of use on two faces of two margins, but in different places on those margins.
2.7	Utilized flake with evidence of use on a single face of three or more margins.
2.8	Utilized flake with evidence of use on two faces of three or more margins, in the same place on those margins.
2.9	Utilized flake with evidence of use on two faces of three or more margins, but in different places on those margins.
2.X.1	Utilized flake of any of the above types with convergent evidence of use.
3.1	Retouched flake with retouch on a single face of a margin.
3.2	Retouched flake with retouch on two faces, in the same place on the same margin.

Table B.5 (cont'd)	
3.3	Retouched flake with retouch on two faces, in different places on the same margin.
3.4	Retouched flake with retouch on a single face of two margins.
3.5	Retouched flake with retouch on two faces of two margins, in the same place on those margins.
3.6	Retouched flake with retouch on two faces of two margins, but in different places on those margins.
3.7	Retouched flake with retouch on a single face of three or more margins.
3.8	Retouched flake with retouch on two faces of three or more margins, in the same place on those margins.
3.9	Retouched flake with retouch on two faces of three or more margins, but in different places on those margins.
3.X.1	Retouched flake of any of the above types with convergent retouch.
4	Denticulate- Stone tool with multiple notches on a single margin or on multiple margins.
5	Side scraper- Stone tool with continuous retouch forming a broad, robust working edge along a side margin.
6	End scarper- Stone tool with continuous retouch forming a broad, robust working edge along the proximal or distal margin.
7.1	Stage 1 Biface- Bifacial tool that has been minimally “edged”, lacks symmetry, has high edge angles, retains much of the cortex, and has a high thickness to length ratio.
7.2	Stage 2 Biface- Bifacial tool that has been thinned, is moderately symmetrical, has high edge angles, retains some of the cortex, and has a moderate thickness to length ratio.
7.3	Stage 3 Biface- Bifacial tool that is mostly symmetrical, has little or no cortex, low edge angles, and a low thickness to length ratio.
7.4	Stage 4 Biface- Bifacial tool that is nearly symmetrical, has little or no cortex, low edge angles, a low thickness to length ratio, but no apparent hafting element.
8	Bifacial Knife- Bifacial tool that is essentially the same as the above tool (7.4) but has a hafting element.
9	Drill- A stone tool, typically a biface, which has a robust distal tip that was used as a drill. This tool often has a hafting element and occasionally has perpendicular usewear on the drill tip.
10.1	Multidirectional Core- A piece of stone from which usable flakes have been removed from a number of platforms.
10.2	Unidirectional Core- A piece of stone from which usable flakes have been removed from a single platform.
10.3	Bipolar Core- A piece of stone from which usable flakes have been removed through the application of the bipolar reduction technique. Often these cores will have evidence of crushing on two or more sides where the force(s) was applied.

Table B.5 (cont'd)	
10.4	Blade Core- A piece of stone from which usable flakes have been removed by “channeling” flakes along the lengthy prepared ridges of the long axis of the core. This type of core can be unidirectional or multidirectional.
11	Block- A stone tool with one or a few flake removals, indicating attempted but aborted retouch.
12	Projectile Point- Note: points were analyzed separately and have their own coding system.
13	Piercer- A stone tool in which the convergent retouch creates a convergent, piercing corner.
15	Retouched Block/Shatter- A stone tool made from a retouched piece of shatter.
16	Utilized Block/Shatter- A stone tool made from a piece of shatter in which the working margins were used but not retouched.
17	Unifacial Retouched Pebble- A minimally worked pebble with retouch on one face.
18	Burin- A stone tool with two convergent margins, created by “snapping” breaks, form a robust graving edge.
19	Pieces Esquillee- A stone tool used as a wedge, causing crushing and spontaneous flake removals from the margins. Resembles a bipolar core but has a lower profile.
20	Notch- A stone tool with a single notch on one of the margins.
21	Abraded Pipestone- A stone tool made of abraded pipestone or catalinite.
22	Abrading Stone- A stone tool used to abrade other stone tools or hard organics.
23	Tested Cobble- A stone tool made of a tested cobble with sporadic, unsystematic flaking.
87	Turkey Gizzard Stone- A small stone smoothed from acting as a gizzard stone for a turkey.
88	Pebbles- An unmodified piece of gravel or cobble.
89	Broken Pebbles- An unmodified fragment of gravel.
90	Shatter- A piece of unmodified shatter.
91	Hammerstone- A pebble or cobble used as a hammer in flake reduction.
92	Unidentified
93	Pebble for smoothing pottery

10) Condition [Con.]

Condition refers to the completeness of the stone tool.

Table B.6: Condition		
Condition Code	Condition (Formal Tools)	Condition (Informal Tools)
1	Complete	Intact
2	Base/haft only	n/a
3	Base/haft and blade, tip missing	Proximal/Medial
4	Blade only	Medial
5	Blade and tip, base/haft missing	Medial/Distal
6	Tip only	n/a
7	Broken longitudinally, may have part of all of the elements	Halving Break Shatter
8	Indeterminate fragment	Indeterminate fragment
9	Broken/unspecified	Broken/unspecified

11) Type of Flake (Old) (recorded for flake tools only) [FTO]

The type of flake (old) refers to the morphological flake “type”. The flake types used for this variable are a “hold over” of previous stone tool analyses conducted in the Salinas Region. As such, this variable was recorded to allow for comparability between the Franks Ruin collection and other sites excavated in the vicinity.

Table B.7: Type of Flake (Old)	
Flake Type (Old) Code	Flake Type (Old)
1	Bifacial reduction flake (small platform, diffuse bulb, dorsal side has many multi-directional flake scars)
2	Bipolar flake reduction (flake scars on dorsal side from two directions with crushing)
3	Platform bearing flake
4	Non-platform bearing flake (but can distinguish dorsal and ventral sides)
5	Shatter (cannot distinguish dorsal and ventral sides)
88	Non-identifiable
99	Non-applicable (includes non-flake lithic tools)

12) Flake Cortex [Cor.]

The flake cortex variable refers to the proportion of the dorsal surface of the stone tool that is covered by cortex, which is defined as the weathered outer surface of a piece of stone.

Table B.8: Dorsal Cortex Cover	
Flake Cortex Code	Percentage of Dorsal Surface with Cortex
1	0%
2	0%-20%
3	21%-50%
4	51%-80%
5	81%-100%
NA	Not applicable

13) Flake Platform Scar Count (recorded for flake tools only) [PS]

The flake platform scar count refers to the number of flake scars (negative impressions left by removed flakes) larger than 3mm (in any dimension) on the flake platform.

14) Flake Dorsal Scar Count (recorded for flake tools only) [DS]

The flake dorsal scar count refers to the number of flake scars (negative impressions left by removed flakes) larger than 3mm (in any dimension) on the dorsal surface of the flake.

15) Initiation Type (recorded for flake tools only) [In.]

The initiation type refers to the type of flake initiation that is evident on the ventral surface of the flake based on the morphology of the surface immediately below the platform.

Table B.9: Initiation	
Initiation Type Code	Initiation Type
1	Shear- Lack of bulb of force or “platform lipping” due to a wedging initiation, which gives the appearance of a sheared flake removal.
2	Bend- “Platform lipping” caused by the bending of the flake away from the point of applied force.
3	Cone- Bulb of force below the platform due to the conchoidal fracture of the stone at the point of applied force.
NA	Not applicable

16) Termination Type (recorded for flake tools only) [Ter.]

The termination type refers to the type of flake termination based on the morphology of the flake termination.

Table B.10: Termination Type	
Termination Type Code	Termination Type

Table B.10 (cont'd)	
1	Feather- Smooth, gradual termination of the flake.
2	Step- Abrupt termination of the flake perpendicular to the direction of the flake removal force.
3	Hinge- Abrupt termination of the flake, caused by the “rolling” of the flake removal force away from the objective piece.
4	Outré passé (also called “Plunging”) - A “reverse hinge fracture” caused by the flake removal force “rolling” towards the objective piece.
NA	Not applicable

17) Type of Flake (New) (recorded for flake tools only) [FTN]

The flake type (new) refers to the morphological flake “type.” The flake types recorded for this variable include a wider array of types with clearer definitions than the flake type (old) variable (see above).

Table B.11: Type of Flake (New)	
Type of Flake (New) Code	Type of Flake (New)
1	Bifacial reduction flake- Flake with “lipped platform”, bend initiation, significant flake curvature, many multidirectional dorsal flake scars, and a feather termination (if flake is complete).
2	Bipolar reduction flake- Flake with crushing on both ends, may also have sheared initiations on either (or both) end(s).
3	Blade reduction flake- Flake that is at least twice as long as it is thick with a prominent ridge down the center of the dorsal side of the flake indicating purposeful blade core preparation.
4	Multidirectional core reduction- Thick flake with many multidirectional flake scars on the dorsal surface indicating that it derived from a multidirectional core.
5	Unidirectional core reduction- Thick flake with many unidirectional flake scars on the dorsal surface indicating that it derived from a unidirectional core.
6	Scraper retouch flake- Flake with a heavily lipped platform, a broad platform angle, and some evidence of scraper usewear at the intersection of the platform and dorsal surface.
7	Notching flake- Flake with the distinctive half-cone shaped profile and feathered termination that is the result of notching a stone tool.
8	Fluting flake- A long, narrow flake with a central ridge along its dorsal surface formed by deliberate preparation through bifacial thinning.

Table B.11 (cont'd)	
9	Pressure flake- A small, elongated flake with a bend initiation and many flake scars on the dorsal surface.
10	General retouch- A general tool resharpening flake with many flake scars on the platform and dorsal surfaces, significant flake curvature, usewear at the intersection of the platform and dorsal surfaces, and feather termination.
11	Shatter- A flake without a single ventral surface and no clear flake initiation point.
88	Indeterminate- Unable to place flake in the above flake categories.

18) Length [Len.]

Length refers to the length of the longest axis of the stone tool, measured in centimeters.

19) Width [Wid.]

Width refers to the width of the longest axis of the stone tool perpendicular to the length, measured in centimeters.

20) Thickness [Thk.]

Thickness refers to the thickness of the longest axis of the stone tool perpendicular to the length/width plane, measured in centimeters.

21) Weight [W.]

Weight refers to the weight of the stone tool to the nearest .1 gram.

22) Extent of Retouch/Usewear on Left Margin [LER]

- This variable refers to the ratio of retouch/usewear on the left margin relative to the total length of the margin.
- Note: The left margin of the tool is the left side of the tool when the ventral face is down and the distal tip of the tool is facing the researcher.
- Note: If there is not an identifiable ventral surface then the “left” and “right” distinctions are assigned arbitrarily.

23) Type of Retouch/Usewear on Left Margin [LTR]

This variable refers to the type of flake terminations left by the retouch/usewear on the left margin.

- Note: There can be more than one type of termination for this variable so the types are coded in descending order of importance for each entry.

Table B.12: Termination Type Code	
Termination Type Code	Termination Type
1	Feather- Smooth, gradual termination of the flake.
2	Step- Abrupt termination of the flake perpendicular to the direction of the flake removal force.
3	Hinge- Abrupt termination of the flake, caused by the “rolling” of the flake removal force away from the objective piece.
4	Outré passé (also called “Plunging”) - A “reverse hinge fracture” caused by the flake removal force “rolling” towards the objective piece.
NA	Not applicable

24) Invasiveness of Retouch/Usewear along the Left Margin [LIR]

This variable refers to the average invasiveness of the retouch/usewear on the left margin, measured as the average ratio of modified surface relative to the area between the margin and the center of the tool.

25) Existence of Trampling Damage on the Left Margin [LT]

This variable refers to the extent of trampling damage, as indicated by half-moon breaks, snaps, and crushing, on the left margin of the stone tool.

Table B.13: Existence of Trampling Damage Code	
Existence of Trampling Damage Code	Extent of Trampling Damage
1.1	Along 10% of margin
1.2	11%-22%
1.3	23%-34%
1.4	34%-45%
1.5	46%-57%
1.6	58%-69%
1.7	70%-81%
1.8	82%-93%
1.9	93%-100%
2	No trampling damage

26) Existence of Purposeful Grinding on Left Margin [LG]

This variable refers to the extent of grinding, as indicated by a continuous crushed surface, on the left margin of the tool. Modifications of this type are often considered indicative of hafting or “backing” of stone tools.

Table B.14: Existence of Purposeful Grinding Code	
Existence of Purposeful Grinding Code	Extent of Grinding
1.1	Along 10% of margin
1.2	11%-22%
1.3	23%-34%
1.4	34%-45%
1.5	46%-57%
1.6	58%-69%
1.7	70%-81%
1.8	82%-93%
1.9	93%-100%
2	No grinding

27) Average Edge Angle along the Left Margin [LEA]

This variable refers to the average edge angle of the modified portion of the left margin, measured in degrees.

28) Left Margin Shape [LS]

This variable refers to the shape of the left margin of the stone tool.

Table B.15: Left Margin Shape Code	
Left Margin Shape Code	Left Margin Shape
1	Straight
2	Concave
3	Convex
4	Irregular

29) Extent of Retouch/Usewear on Right Margin [RER]

- This variable refers to the ratio of retouch/usewear on the right margin relative to the total length of the margin.
- Note: The right margin of the tool is the right side of the tool when the ventral face is down and the distal tip of the tool is facing the researcher.
- Note: If there is not an identifiable ventral surface then the “left” and “right” distinctions are assigned arbitrarily.

30) Type of Retouch/Usewear on Right Margin [RTR]

- This variable refers to the type of flake terminations left by the retouch/usewear on the right margin.
- Note: There can be more than one type of termination for this variable so the types are coded in descending order of importance for each entry.

Table B.16: Termination Type Code	
Termination Type Code	Termination Type
1	Feather- Smooth, gradual termination of the flake.
2	Step- Abrupt termination of the flake perpendicular to the direction of the flake removal force.
3	Hinge- Abrupt termination of the flake, caused by the “rolling” of the flake removal force away from the objective piece.
4	Outré passé (also called “Plunging”) - A “reverse hinge fracture” caused by the flake removal force “rolling” towards the objective piece.
NA	Not applicable

31) Invasiveness of Retouch/Usewear along the Right Margin [RIR]

This variable refers to the average invasiveness of the retouch/usewear on the right margin, measured as the average ratio of modified surface relative to the area between the margin and the center of the tool.

32) Existence of Trampling Damage on the Right Margin [RT]

This variable refers to the extent of trampling damage, as indicated by half-moon breaks, snaps, and crushing, on the right margin of the stone tool.

Table B.17: Existence of Trampling Damage Code	
Existence of Trampling Damage Code	Extent of Trampling Damage
1.1	Along 10% of margin
1.2	11%-22%
1.3	23%-34%
1.4	34%-45%
1.5	46%-57%
1.6	58%-69%
1.7	70%-81%
1.8	82%-93%
1.9	93%-100%
2	No trampling damage

33) Existence of Purposeful Grinding on Right Margin [RG]

This variable refers to the extent of grinding, as indicated by a continuous crushed surface, on the right margin of the tool. Modifications of this type are often considered indicative of hafting or “backing” of stone tools.

Table B.18: Existence of Purposeful Grinding Code	
Existence of Purposeful Grinding Code	Extent of Grinding
1.1	Along 10% of margin

Table B.18 (cont'd)	
1.2	11%-22%
1.3	23%-34%
1.4	34%-45%
1.5	46%-57%
1.6	58%-69%
1.7	70%-81%
1.8	82%-93%
1.9	93%-100%
2	No grinding

34) Average Edge Angle along the Right Margin [REA]

This variable refers to the average edge angle of the modified portion of the right margin, measured in degrees.

35) Right Margin Shape [RS]

This variable refers to the shape of the right margin of the stone tool.

Table B.19: Right Margin Shape Code	
Right Margin Shape Code	Right Margin Shape
1	Straight
2	Concave
3	Convex
4	Irregular

36) Extent of Retouch/Usewear on Distal Margin [DER]

- This variable refers to the ratio of retouch/usewear on the distal margin relative to the total length of the margin.
- Note: The distal margin of the stone tool is the tip of the tool, the terminal end of a flake tool, or was assigned arbitrarily if the former or latter are not evident.

37) Type of Retouch/Usewear on Distal Margin [DTR]

- This variable refers to the type of flake terminations left by the retouch/usewear on the distal margin.
- Note: There can be more than one type of termination for this variable so the types are coded in descending order of importance for each entry.

Table B.20: Termination Type Code	
Termination Type Code	Termination Type
1	Feather- Smooth, gradual termination of the flake.

Table B.20 (cont'd)	
2	Step- Abrupt termination of the flake perpendicular to the direction of the flake removal force.
3	Hinge- Abrupt termination of the flake, caused by the “rolling” of the flake removal force away from the objective piece.
4	Outré passé (also called “Plunging”) - A “reverse hinge fracture” caused by the flake removal force “rolling” towards the objective piece.
NA	Not applicable

38) Invasiveness of Retouch/Usewear along the Distal Margin [DIR]

This variable refers to the average invasiveness of the retouch/usewear on the distal margin, measured as the average ratio of modified surface relative to the area between the margin and the center of the tool.

39) Existence of Trampling Damage on the Distal Margin [DT]

This variable refers to the extent of trampling damage, as indicated by half-moon breaks, snaps, and crushing, on the distal margin of the stone tool.

Table B.21: Existence of Trampling Damage Code	
Existence of Trampling Damage Code	Extent of Trampling Damage
1.1	Along 10% of margin
1.2	11%-22%
1.3	23%-34%
1.4	34%-45%
1.5	46%-57%
1.6	58%-69%
1.7	70%-81%
1.8	82%-93%
1.9	93%-100%
2	No trampling damage

40) Nothing [Noth.]

This variable refers to nothing. Due to an error in the coding process this variable was recorded as “NA” and serves as a place holder.

41) Existence of Purposeful Grinding on Distal Margin [DG]

This variable refers to the extent of grinding, as indicated by a continuous crushed surface, on the distal margin of the tool. Modifications of this type are often considered indicative of hafting or “backing” of stone tools.

Table B.22: Existence of Purposeful Grinding Code	
Existence of Purposeful Grinding Code	Extent of Grinding
1.1	Along 10% of margin
1.2	11%-22%
1.3	23%-34%
1.4	34%-45%
1.5	46%-57%
1.6	58%-69%
1.7	70%-81%
1.8	82%-93%
1.9	93%-100%
2	No grinding

42) Average Edge Angle along the Distal Margin [DEA]

This variable refers to the average edge angle of the modified portion of the distal margin, measured in degrees.

43) Distal Margin Shape [DS]

This variable refers to the shape of the distal margin of the stone tool.

Table B.23: Distal Margin Shape Code	
Distal Margin Shape Code	Distal Margin Shape
1	Straight
2	Concave
3	Convex
4	Irregular

44) Extent of Retouch/Usewear on Proximal Margin [PER]

- This variable refers to the ratio of retouch/usewear on the proximal margin relative to the total length of the margin.
- Note: The proximal margin of the stone tool is the base of the tool, the initiation end of a flake tool, or was assigned arbitrarily if the former or latter are not evident.

45) Type of Retouch/Usewear on Proximal Margin [PTR]

- This variable refers to the type of flake terminations left by the retouch/usewear on the proximal margin.
- Note: There can be more than one type of termination for this variable so the types are coded in descending order of importance for each entry.
-

Table B.24: Termination Type Code	
Termination Type Code	Termination Type
1	Feather- Smooth, gradual termination of the flake.
2	Step- Abrupt termination of the flake perpendicular to the direction of the flake removal force.
3	Hinge- Abrupt termination of the flake, caused by the “rolling” of the flake removal force away from the objective piece.
4	Outré passé (also called “Plunging”) - A “reverse hinge fracture” caused by the flake removal force “rolling” towards the objective piece.
NA	Not applicable

46) Invasiveness of Retouch/Usewear along the Proximal Margin [PIR]

This variable refers to the average invasiveness of the retouch/usewear on the proximal margin, measured as the average ratio of modified surface relative to the area between the margin and the center of the tool.

47) Existence of Trampling Damage on the Proximal Margin [PT]

This variable refers to the extent of trampling damage, as indicated by half-moon breaks, snaps, and crushing, on the proximal margin of the stone tool.

Table B.25: Existence of Trampling Damage Code	
Existence of Trampling Damage Code	Extent of Trampling Damage
1.1	Along 10% of margin
1.2	11%-22%
1.3	23%-34%
1.4	34%-45%
1.5	46%-57%
1.6	58%-69%
1.7	70%-81%
1.8	82%-93%
1.9	93%-100%
2	No trampling damage

48) Existence of Purposeful Grinding on Proximal Margin [PG]

This variable refers to the extent of grinding, as indicated by a continuous crushed surface, on the proximal margin of the tool. Modifications of this type are often considered indicative of hafting or “backing” of stone tools.

Table B.26: Existence of Purposeful Grinding Code	
Existence of Purposeful Grinding Code	Extent of Grinding

Table B.26 (cont'd)	
1.1	Along 10% of margin
1.2	11%-22%
1.3	23%-34%
1.4	34%-45%
1.5	46%-57%
1.6	58%-69%
1.7	70%-81%
1.8	82%-93%
1.9	93%-100%
2	No grinding

49) Average Edge Angle along the Proximal Margin [PEA]

This variable refers to the average edge angle of the modified portion of the proximal margin, measured in degrees.

50) Proximal Margin Shape [PS]

This variable refers to the shape of the proximal margin of the stone tool.

Table B.27: Proximal Margin Shape Code	
Proximal Margin Shape Code	Proximal Margin Shape
1	Straight
2	Concave
3	Convex
4	Irregular

51) Overall Shape of Tool [OS]

This variable refers to the overall shape of the tool, as seen from above.

Table B.28: Overall Shape of Tool Code	
Overall Shape of Tool Code	Shape
1	Parallel margins, but does not fit any of the categories below.
2	Ovate
3	Excurvate
4	Diamond
5	Triangular
6	Incurvate
7	Concave/Convex
8	Irregular
9	Rectangular
NA	Not applicable

52) Overall Shape of Tool (Transverse) [TS]

This variable refers to the shape of the tool, as seen in transverse cross-section.

Table B.29: Transverse Shape Code	
Transverse Shape Code	Shape
1	Biplano (parallel)
2	Biplano (convergent)
3	Plano-triangular
4	Diamond
5	Plano-convex
6	Convex-concave
7	Biconcave
8	Biconvex
9	Ovate
10	Circular
11	Lenticular
12	Irregular

53) Overall Shape of Tool (Longitudinal) [Lo.S]

This variable refers to the tool shape, as seen from a longitudinal cross-section.

Table B.30: Longitudinal Shape Code	
Longitudinal Shape Code	Shape
1	Biconvex
2	Ovate
3	Plano-convex
4	Convex-concave
5	Lenticular
6	Biplano
7	Triangular
8	Diamond
9	Irregular

54) Provenience East [E]

The provenience east refers to the easterly coordinate of the excavation unit.

55) Provenience North [N]

The provenience north refers to the northerly coordinate of the excavation unit.

56) Level [L]

Level refers to the depth (in levels) of the excavation unit

APPENDIX C

Projectile Point Variable Definition

Note: Definitions are presented in the same order as they appear in both the projectile point coding sheet and the spreadsheets of the recorded projectile point data.

Note: The abbreviations of the variable names are included in brackets.

1) Bag Number [Bag#]

The bag number is unique to the particular excavation unit, level, and artifact type in question. A group of artifacts of the same type (e.g. projectile points) from the same excavation unit and level should share the same bag number, unless they were excavated at different times.

2) Lot Number [Lot#]

The lot number is unique to the excavation unit and level in question, regardless of artifact type.

3) Artifact Number [Art.#]

The artifact number is unique to the specific artifact in question, within a single artifact type (e.g. projectile points). These numbers were assigned sequentially in the order that each of the artifacts was analyzed.

4) General Provenience [Prov.]

The general provenience refers to the groups of excavation units from different areas within and around the pueblo.

Table C.1: Frank's Ruin (LA-9032) Excavations Units		
Provenience Code	Provenience Name	Excavation Units Within Provenience
1	Area A	(492E,489N), (493E, 492N), (494E, 492N)
2	Area B	(489E, 511N), (490E, 511N), (491E, 511N), (486E, 511N)
3	Area C	(498E, 514N), (499E, 514N), (500E, 514N), (498E, 515N) (499E, 515N), (500E, 515N)
4	Area D	(517E, 492N), (517E, 495N), (518E, 494N), (519E, 496N), (516E, 496N)
5	Area E	(506E, 486N), (508E, 486N), (506E, 487N), (505E, 485N), (505E, 484N), (505E, 483N)
6	Pothunter Pit 1	(503E, 515N)

Table C.1 (cont'd)		
7	Pothunter Pit 2	(484E, 495N), (484E, 493N)
8	Pothunter Pit 3	(498E, 503N)
9	Pothunter Pit 4	Not excavated
10	Midden 1	(510E, 522N)
11	Midden 2	(525E, 513N), (524E, 513N), (524E, 514N)
12	Midden 3	(476E, 495N)

Table C.2: Pueblo de la Mesa (LA-2091) Excavation Units		
Provenience Code	Provenience Name	Excavation Units Within Provenience
1	North Plaza (Upper Plaza)	(515E, 531N), (507E, 537N), (507E, 541N)
2	South Plaza (Lower Plaza)	(540E, 500N), (517E, 496N), (518E, 496N)
3	Kiva 1	Not in Sample
4	Kiva 2	Not in Sample
5	Northwest Midden	Two Units not on Grid
6	Southwest Midden	Two Units not on Grid
7	West Midden	Not in Sample
8	Room 1	Not in Sample
9	Room 3	Not in Sample
10	Room 4	(516E, 506N), (517N, 507N)
11	Room 5	(521E, 536N)
12	Room 6	Not in Sample
13	Room 7	Not in Sample
14	Room 8	Not in Sample
15	Roomblock V	Not in Sample

5) Structure Number [St.#]

The structure number refers to the numbered room in which the excavation unit is located.

6) Feature Number [Ft.]

The feature number refers to the numbered feature in which the excavated level is located.

7) Raw Material [R.M]

The raw material type refers to the type of stone from which the artifact was made.

Table C.3: Raw Material Code	
Raw Material Code	Raw Material Type
1	Chert (includes a wide variety of non-crystalline forms of different textures)
2	Chalcedony
3	Quartzite (large crystal faces, rough texture)
4	Limestone
5	Sandstone
6	Felsic igneous (light coloration)
7	Mafic igneous (dark coloration)
8	Obsidian
9	Siltstone
10	Petrified wood
11	Recycled groundstone, limestone
12	Quartzite (small crystal faces)
13	Gypsum
14	Pipestone
15	Quartz Crystal
16	Mica
99	Unknown

8) Color [Col.]

The color refers to the predominate, non-cortical, color of the stone from which the artifact was made.

Table C.4: Stone Color	
Color Code	Color
1	Clear
2	White (Mountainair chert)
3	Gray
4	Black or dark gray
5	Brown or caramel color
6	Purple
7	Reddish
8	Orange
9	Yellow-Amber
10	Greenish, yellow-green
11	Pink
12	Beige or tan
15	Peach
16	Dark brown
17	Red-orange
18	Maroon

Table C.4 (cont'd)	
19	White (non-Mountainair)
20	Heat-treated Mountainair (white, glassy)
21	Tan limestone
22	Burnt, cannot tell original color
23	Maroon-clear (chalcedony)
24	Greenish-brown
30	Opaque black obsidian
31	Clear black obsidian
32	Mafic, black-orange mottled
33	Red/tan mottled

9) Flake Cortex [Cor.]

The flake cortex variable refers to the proportion of the dorsal surface of the projectile point that is covered by cortex, which is defined as the weathered outer surface of a piece of stone.

Table C.5: Dorsal Cortex Code	
Flake Cortex Code	Percentage of Dorsal Surface with Cortex
1	0%
2	0%-20%
3	21%-50%
4	51%-80%
5	81%-100%
NA	Not applicable

10) Condition [Con.]

Condition refers to the completeness of the projectile point.

Table C.6: Condition Code	
Condition Code	Condition
1	Complete
2	Base/haft only
3	Base/haft and blade, tip missing
4	Blade only
5	Blade and tip, base/haft missing
6	Tip only
7	Broken longitudinally, may have part of all of the elements
8	Indeterminate fragment
9	Broken/unspecified

11) Projectile Point Type [PT]

This variable refers to the morphological type of the projectile point.

Table C.7: Projectile Point Type Code	
Projectile Point Type Code	Projectile Point Type
1	Stemmed (Shouldered)
2	Lanceolate
3	Side Notch
4	Side Notch and Basal Notch
5	Basal Notch
6	Corner Notch
7	Corner Notch and Basal Notch
8	Triangular
9	Not applicable/Incomplete
10	Side Notch Serrated

12) Type of Flake (Old) [FTO]

The type of flake (old) refers to the morphological flake “type”. The flake types used for this variable are a “hold over” of previous projectile point analyses conducted in the Salinas Region. As such, this variable was recorded to allow for comparability between the Frank’s Ruin collection and other sites excavated in the vicinity.

Table C.8: Flake Type (Old) Code	
Flake Type (Old) Code	Flake Type (Old)
1	Bifacial reduction flake (small platform, diffuse bulb, dorsal side has many multi-directional flake scars)
2	Bipolar flake reduction (flake scars on dorsal side from two directions with crushing)
3	Platform bearing flake
4	Non-platform bearing flake (but can distinguish dorsal and ventral sides)
5	Shatter (cannot distinguish dorsal and ventral sides)
88	Non-identifiable
99	Non-applicable (includes non-flake lithic tools)

13) Type of Flake (New) [FTN]

The flake type (new) refers to the morphological flake “type.” The flake types recorded for this variable include a wider array of types with clearer definitions than the flake type (old) variable (see above).

Table C.9: Type of Flake (New) Code	
Type of Flake (New) Code	Type of Flake (New)
1	Bifacial reduction flake- Flake with “lipped platform”, bend initiation, significant flake curvature, many multidirectional dorsal flake scars, and a feather termination (if flake is complete).
2	Bipolar reduction flake- Flake with crushing on both ends, may also have sheared initiations on either (or both) end(s).
3	Blade reduction flake- Flake that is at least twice as long as it is thick with a prominent ridge down the center of the dorsal side of the flake indicating purposeful blade core preparation.
4	Multidirectional core reduction- Thick flake with many multidirectional flake scars on the dorsal surface indicating that it derived from a multidirectional core.
5	Unidirectional core reduction- Thick flake with many unidirectional flake scars on the dorsal surface indicating that it derived from a unidirectional core.
6	Scraper retouch flake- Flake with a heavily lipped platform, a broad platform angle, and some evidence of scraper usewear at the intersection of the platform and dorsal surface.
7	Notching flake- Flake with the distinctive half-cone shaped profile and feathered termination that is the result of notching a projectile point.
8	Fluting flake- A long, narrow flake with a central ridge along its dorsal surface formed by deliberate preparation through bifacial thinning.
9	Pressure flake- A small, elongated flake with a bend initiation and many flake scars on the dorsal surface.
10	General retouch- A general tool resharpening flake with many flake scars on the platform and dorsal surfaces, significant flake curvature, usewear at the intersection of the platform and dorsal surfaces, and feather termination.
11	Shatter- A flake without a single ventral surface and no clear flake initiation point.
88	Indeterminate- Unable to place flake in the above flake categories.

14) Length [Len.]

Length refers to the length of the longest axis of the projectile point measured in centimeters.

15) Width [Wid.]

Width refers to the width of the longest axis of the projectile point perpendicular to the length, measured in centimeters.

16) Thickness [Thk.]

Thickness refers to the thickness of the longest axis of the projectile point perpendicular to the length/width plane, measured in centimeters.

17) Weight [W.]

Weight refers to the weight of the projectile point to the nearest .1 gram.

18) Base Width [BW]

This variable refers to the width of the base of the tool, measured in centimeters.

19) Base Thickness [BT]

This variable refers to the thickness of the base of the tool, measured in centimeters.

20) Base Shape [BS]

This variable refers to the shape of the base.

Table C.10: Base Shape Code	
Base Shape Code	Base Shape
1	Straight
2	Concave (broad)
3	Concave (slight)
4	Concave (restricted)
5	Concave (angular)
6	Concave (angular broad)
7	Concave (notched)
8	Concave (double notched)
9	Convex (broad)
10	Convex (constricted)
11	Convex (rounded)

21) Haft Length [HL]

- This variable refers to the length of the haft, measured in centimeters.

22) Haft Width (Distal) [HWD]

This variable refers to the width of the distal end of the haft, measured in centimeters.

23) Haft Width (Proximal) [HWP]

This variable refers to the width of the proximal end of the haft, measured in centimeters.

- Note: This variable is numbered 21.5 on the original, hand written, coding sheets due to an error in the coding process which required the splitting of a spreadsheet cell to maintain the proper place of the rest of the recorded data. This note only applies to the original, hand written, coding sheets. The error was corrected on the later electronic versions of the projectile point spreadsheets.

24) Haft Thickness [HT]

This variable refers to thickness of the haft, measured in centimeters.

25) Haft Base Shape [HBS]

This variable refers to the shape of the haft and base on corner notched, side notched, and stemmed projectile points.

Table C.11: Haft Base Shape Code	
Haft Base Shape Code	Haft Base Shape
1	Straight
2	Expanding
3	Contracting
4	Rounded
5	Pointed
6	Eared (Tanged/Basal Notch)
7	Incurvate
8	Excurvate

26) Haft Grinding [HG]

This variable refers to the extent of grinding, as indicated by a continuous crushed surface, on the haft of the projectile point.

Table C.12: Existence of Purposeful Grinding Code	
Existence of Purposeful Grinding Code	Extent of Grinding
1.1	Along 10% of margin
1.2	11%-22%
1.3	23%-34%
1.4	34%-45%
1.5	46%-57%
1.6	58%-69%
1.7	70%-81%

Table C.12 (cont'd)	
1.8	82%-93%
1.9	93%-100%
2	No grinding

27) Shoulder Width [SW]

This variable refers to the width of the shoulder, measured in centimeters.

28) Shoulder Thickness [ST]

This variable refers to the thickness of the shoulder, measured in centimeters.

29) Shoulder Shape [SS]

This variable refers to the shoulder shape on corner notched, side notched, and stemmed projectile points.

Table C.13: Shoulder Shape Code	
Shoulder Shape Code	Shoulder Shape
1	Abrupt (side notched and stemmed)
2	Inversely tapered (side notched)
3	Tapered/sloping (side notched)
4	Rounded (side notched)
5	Expanded (side notch)
6	Weakly oblique simple (corner notched)
7	Extended oblique simple (corner notched)
8	Weakly oblique expanded (corner notched)

30) Blade Length [BL]

This variable refers to the length of the blade, measured in centimeters.

31) Max Blade Width [BW]

This variable refers to the maximum width of the blade, measured in centimeters.

32) Max Blade Thickness [BT]

This variable refers to the maximum blade thickness, measured in centimeters.

33) Blade Shape [BS]

The blade shape refers to the shape of the blade, measured in centimeters.

Table C.14: Blade Shape Code	
Blade Shape Code	Blade Shape
1	Straight (parallel)
2	Straight (triangular)
3	Ovate
4	Concave
5	Convex
6	Serrated
7	Denticulate
8	Irregular
9	Not applicable/incomplete

34) Extent of Retouch/Usewear on the Left Blade Margin [LER]

This variable refers to the extent of retouch/usewear on the left blade margin, measured as the ratio of modified margin relative to the total margin length.

- Note: “left” and “right” distinctions assigned arbitrarily.

35) Type of Retouch/Usewear Terminations along the Left Blade Margin [LRT]

This variable refers to the type of retouch/usewear terminations along the left blade margin.

- Note: There can be more than one type of termination for this variable so the types are coded in descending order of importance for each entry.

Table C.15: Termination Type Code	
Termination Type Code	Termination Type
1	Feather- Smooth, gradual termination of the flake.
2	Step- Abrupt termination of the flake perpendicular to the direction of the flake removal force.
3	Hinge- Abrupt termination of the flake, caused by the “rolling” of the flake removal force away from the objective piece.
4	Outré passé (also called “Plunging”) - A “reverse hinge fracture” caused by the flake removal force “rolling” towards the objective piece.
NA	Not applicable

36) Invasiveness of Retouch/Usewear along the Left Blade Margin [LIR]

This variable refers to the average invasiveness of the retouch/usewear on the left blade margin, measured as the average ratio of modified surface relative to the area between the margin and the center of the projectile point.

37) Existence of Trampling Damage on the Left Blade Margin [LT]

This variable refers to the extent of trampling damage, as indicated by half-moon breaks, snaps, and crushing, on the left blade margin of the projectile point.

Table C.16: Existence of Trampling Damage Code	
Existence of Trampling Damage Code	Extent of Trampling Damage
1.1	Along 10% of margin
1.2	11%-22%
1.3	23%-34%
1.4	34%-45%
1.5	46%-57%
1.6	58%-69%
1.7	70%-81%
1.8	82%-93%
1.9	93%-100%
2	No trampling damage

38) Average Edge Angle along the Left Blade Margin [LEA]

This variable refers to the average edge angle of the modified portion of the left blade margin, measured in degrees.

39) Left Blade Margin Shape [LBS]

This variable refers to the shape of the left blade margin of the projectile point.

Table C.17: Left Margin Shape Code	
Left Margin Shape Code	Left Margin Shape
1	Straight
2	Concave
3	Convex
4	Irregular
5	Not applicable/incomplete
6	Denticulate (straight)

40) Depth of Left Notch [LN]

This variable refers to the depth of the left notch on side notched and corner notched projectile points, measured in centimeters.

41) Extent of Retouch/Usewear on the Right Blade Margin [RER]

This variable refers to the extent of retouch/usewear on the right blade margin, measured as the ratio of modified margin relative to the total margin length.

- Note: “left” and “right” distinctions assigned arbitrarily.

42) Type of Retouch/Usewear Terminations along the Right Blade Margin [RRT]

This variable refers to the type of retouch/usewear terminations along the right blade margin.

- Note: There can be more than one type of termination for this variable so the types are coded in descending order of importance for each entry.

Table C.18: Termination Type Code	
Termination Type Code	Termination Type
1	Feather- Smooth, gradual termination of the flake.
2	Step- Abrupt termination of the flake perpendicular to the direction of the flake removal force.
3	Hinge- Abrupt termination of the flake, caused by the “rolling” of the flake removal force away from the objective piece.
4	Outré passé (also called “Plunging”) - A “reverse hinge fracture” caused by the flake removal force “rolling” towards the objective piece.
NA	Not applicable

43) Invasiveness of Retouch/Usewear along the Right Blade Margin [RIR]

This variable refers to the average invasiveness of the retouch/usewear on the right blade margin, measured as the average ratio of modified surface relative to the area between the margin and the center of the projectile point.

44) Existence of Trampling Damage on the Right Blade Margin [RT]

This variable refers to the extent of trampling damage, as indicated by half-moon breaks, snaps, and crushing, on the right blade margin of the projectile point.

Table C.19: Existence of Trampling Damage Code	
Existence of Trampling Damage Code	Extent of Trampling Damage
1.1	Along 10% of margin
1.2	11%-22%
1.3	23%-34%
1.4	34%-45%
1.5	46%-57%
1.6	58%-69%
1.7	70%-81%
1.8	82%-93%
1.9	93%-100%
2	No trampling damage

45) Average Edge Angle along the Right Blade Margin [REA]

This variable refers to the average edge angle of the modified portion of the right blade margin, measured in degrees.

46) Right Blade Margin Shape [RBS]

This variable refers to the shape of the right blade margin of the projectile point.

Table C.20: Right Margin Shape Code	
Right Margin Shape Code	Right Margin Shape
1	Straight
2	Concave
3	Convex
4	Irregular
5	Not applicable/incomplete
6	Denticulate (straight)

47) Depth of Right Notch [RN]

This variable refers to the depth of the right notch on side notched and corner notched projectile points, measured in centimeters.

48) Depth of Basal Notch [BN]

This variable refers to the depth of the basal notch, measured in centimeters.

49) Overall Shape of Projectile Point [OS]

This variable refers to the overall shape of the projectile point, as seen from above.

Table C.21: Overall Shape of Tool Code	
Overall Shape of Tool Code	Shape
1	Parallel margins, but does not fit any of the categories below.
2	Ovate
3	Excurvate
4	Diamond
5	Triangular
6	Incurvate
7	Concave/Convex
8	Irregular
9	Rectangular
NA	Not applicable

50) Overall Shape of Projectile Point (Transverse) [TS]

This variable refers to the shape of the projectile point, as seen in transverse cross-section.

Table C.22: Transverse Shape Code	
Transverse Shape Code	Shape
1	Biplano (parallel)
2	Biplano (convergent)
3	Plano-triangular
4	Diamond
5	Plano-convex
6	Convex-concave
7	Biconcave
8	Biconvex
9	Ovate
10	Circular
11	Lenticular
12	Irregular

51) Overall Shape of Projectile Point (Longitudinal) [Lon.S]

This variable refers to the shape of the projectile point, as seen from a longitudinal cross-section.

Table C.23: Longitudinal Shape Code	
Longitudinal Shape Code	Shape
1	Biconvex
2	Ovate
3	Plano-convex
4	Convex-concave
5	Lenticular
6	Biplano
7	Triangular
8	Diamond
9	Irregular

52) Provenience East [E]

The provenience east refers to the easterly coordinate of the excavation unit.

53) Provenience North [N]

The provenience north refers to the northerly coordinate of the excavation unit.

54) Level [L]

Level refers to the depth (in levels) of the excavation unit

55) Comments [Com]

This space is reserved for any miscellaneous comment on the artifact.

56) Symmetry of Projectile Point Outline [Sym]

This variable measures the symmetry of the intact portions of the projectile point.

Table C.24: Symmetry Code	
Symmetry Code	Symmetry
1	Symmetrical
2	Mostly symmetrical
3	Somewhat symmetrical
4	Slightly symmetrical
5	Not symmetrical

57. Blade Flaking Pattern [BFP]

This variable refers to the type of flaking pattern on the blade of the projectile point.

Table C.25: Blade Flaking Pattern Code	
Blade Flaking Pattern Code	Blade Flaking Pattern
1	Parallel (transverse)
2	Parallel (oblique)
3	Chevron
4	Collateral
5	Fluted
6	Random

APPENDIX D

Table D.1: Frank's Ruin Debitage (All Variables)

Bag	Lot	Art.	Pv.	St.	Ft.	R.M.	Cl.	AT.	C.	FTO	Cr.	PS	DS	In.	Ter.	FTN	LD	W	E	N	L
240	54	1	1	4	NA	4	3	1	4	4	1	NA	4	NA	2	3	45	2.6	493	492	4
264	5	2	2	NA	NA	4	3	1	3	3	2	0	4	3	3	88	45	8.4	490	511	1
264	5	3	2	NA	NA	1	2	1	4	4	3	NA	5	NA	2	88	20	1.4	490	511	1
330	65	4	1	5	NA	4	3	1	1	3	1	0	9	2	1	5	45	9.4	494	492	5
426	82	5	11	NA	NA	1	2	1	1	3	4	0	0	3	3	88	25	0.5	525	513	2
426	82	6	11	NA	NA	1	2	90	9	5	1	NA	NA	NA	NA	11	15	0.4	525	513	2
426	82	7	11	NA	NA	1	2	90	9	5	1	NA	NA	NA	NA	11	25	1.1	525	513	2
426	82	8	11	NA	NA	1	2	1	4	4	4	NA	0	NA	2	88	35	3.7	525	513	2
426	82	9	11	NA	NA	2	19	1	4	4	1	NA	4	NA	2	88	20	0.5	525	513	2
426	82	10	11	NA	NA	2	19	1	4	4	2	NA	4	NA	2	88	25	1	525	513	2
426	82	11	11	NA	NA	1	2	1	4	4	4	NA	0	NA	2	88	20	0.5	525	513	2
426	82	12	11	NA	NA	1	2	1	4	4	2	NA	3	NA	2	88	15	0.1	525	513	2
426	82	13	11	NA	NA	1	2	1	4	4	1	NA	4	NA	2	88	20	0.4	525	513	2
426	82	14	11	NA	NA	1	2	1	4	4	2	NA	1	NA	2	88	20	0.4	525	513	2
426	82	15	11	NA	NA	2	19	1	3	3	1	1	5	3	2	5	25	1.7	525	513	2
426	82	16	11	NA	NA	1	2	1	5	4	1	NA	2	NA	1	88	30	1.8	525	513	2
426	82	17	11	NA	NA	2	2	1	5	4	2	NA	9	NA	1	88	25	1.3	525	513	2
426	82	18	11	NA	NA	1	2	1	5	4	3	NA	2	NA	1	88	15	0.3	525	513	2
426	82	19	11	NA	NA	1	2	1	5	4	1	NA	5	NA	1	5	25	0.9	525	513	2
426	82	20	11	NA	NA	2	19	1	5	4	1	NA	4	NA	1	88	15	0.1	525	513	2
426	82	21	11	NA	NA	1	2	1	5	4	1	NA	4	NA	1	88	15	0.1	525	513	2
426	82	22	11	NA	NA	1	2	1	5	4	1	NA	3	NA	1	88	20	0.9	525	513	2
426	82	23	11	NA	NA	1	2	90	9	5	1	NA	NA	NA	NA	11	15	0.4	525	513	2
426	82	24	11	NA	NA	4	3	1	5	4	1	NA	1	NA	1	88	25	1.4	525	513	2
426	82	25	11	NA	NA	4	3	1	5	4	1	NA	1	NA	1	88	20	0.9	525	513	2
426	82	26	11	NA	NA	4	3	1	5	4	3	NA	2	NA	1	88	20	0.6	525	513	2
426	82	27	11	NA	NA	1	7	1	3	3	1	2	9	3	2	4	30	2.2	525	513	2
426	82	28	11	NA	NA	1	7	1	1	3	1	1	4	3	1	88	15	0.2	525	513	2
426	82	29	11	NA	NA	1	7	1	4	4	1	NA	4	NA	2	88	15	0.3	525	513	2
627	95	30	3	2	NA	1	7	1	4	4	3	NA	2	NA	2	88	35	4.5	499	514	9

Table D.1 (cont'd)

627	95	31	3	2	NA	1	1	2	1	5	4	1	NA	2	NA	1	88	25	1	499	514	9
594	103	32	1	4	NA	4	3	3	1	3	3	1	0	2	2	2	88	40	8.3	493	492	10
438	84	33	1	5	NA	1	2	1	1	4	4	3	NA	3	NA	2	88	15	0.2	494	492	7
438	84	34	1	5	NA	4	3	3	1	1	3	2	1	7	2	1	4	30	5.1	494	492	7
438	84	35	1	5	NA	4	3	3	1	3	3	1	1	3	2	2	4	30	1.6	494	492	7
438	84	36	1	5	NA	4	3	3	1	5	4	1	NA	2	NA	1	88	25	1.7	494	492	7
438	84	37	1	5	NA	4	3	3	1	4	4	1	NA	3	NA	2	88	25	1.3	494	492	7
438	84	38	1	5	NA	1	5	90	9	9	5	1	NA	NA	NA	NA	11	20	1.1	494	492	7
438	84	39	1	5	NA	1	7	90	9	9	5	1	NA	NA	NA	NA	11	20	1.3	494	492	7
846	134	40	12	NA	NA	3	6	1	4	4	4	1	NA	1	NA	2	88	15	0.2	476	495	2
846	134	41	12	NA	NA	2	23	1	3	3	2	1	1	7	3	2	1	20	0.6	476	495	2
783	132	42	11	NA	NA	4	3	1	1	1	3	1	1	1	3	1	88	30	2.9	524	514	2
783	132	43	11	NA	NA	4	3	1	1	3	3	1	1	1	3	2	88	25	2.7	524	514	2
783	132	44	11	NA	NA	7	3	1	1	1	3	1	1	4	3	3	4	25	0.9	524	514	2
783	132	45	11	NA	NA	7	3	1	1	5	4	1	NA	5	NA	3	88	25	1.3	524	514	2
783	132	46	11	NA	NA	1	18	90	9	9	5	1	NA	NA	NA	NA	11	25	1	524	514	2
783	132	47	11	NA	NA	1	2	90	9	9	5	1	NA	NA	NA	NA	11	20	0.5	524	514	2
783	132	48	11	NA	NA	2	19	1	1	1	3	2	2	1	3	1	88	30	2	524	514	2
783	132	49	11	NA	NA	1	2	1	1	3	3	2	3	3	3	2	4	40	4.9	524	514	2
783	132	50	11	NA	NA	1	2	1	1	4	4	1	NA	1	NA	2	88	20	0.9	524	514	2
783	132	51	11	NA	NA	1	2	1	1	4	4	3	NA	2	NA	2	88	20	0.4	524	514	2
783	132	52	11	NA	NA	1	2	1	1	3	3	1	1	5	3	2	88	20	0.5	524	514	2
783	132	53	11	NA	NA	2	19	1	1	5	4	1	NA	6	NA	1	88	20	0.8	524	514	2
783	132	54	11	NA	NA	2	19	1	1	5	4	2	NA	5	NA	3	5	25	3	524	514	2
783	132	55	11	NA	NA	1	2	1	1	4	4	2	NA	9	NA	2	88	25	1.9	524	514	2
783	132	56	11	NA	NA	1	2	1	1	3	3	2	1	4	3	2	5	25	2.5	524	514	2
783	132	57	11	NA	NA	1	2	1	1	5	4	2	NA	6	NA	1	88	25	3.5	524	514	2
783	132	58	11	NA	NA	2	19	1	1	5	4	2	NA	1	NA	1	88	20	0.6	524	514	2
783	132	59	11	NA	NA	1	2	1	1	4	4	1	NA	3	NA	2	88	20	0.6	524	514	2
783	132	60	11	NA	NA	1	2	1	1	9	5	3	NA	NA	NA	NA	11	30	8.9	524	514	2
783	132	61	11	NA	NA	1	3	1	1	5	4	3	NA	5	NA	3	88	30	1.9	524	514	2
783	132	62	11	NA	NA	1	3	90	9	9	5	1	NA	NA	NA	NA	11	20	0.6	524	514	2
783	132	63	11	NA	NA	1	3	1	1	5	4	1	NA	2	NA	3	88	20	1	524	514	2
724	124	64	12	NA	NA	1	2	1	1	3	3	2	0	5	3	2	88	20	0.3	476	495	0

Table D.1 (cont'd)

724	124	65	12	NA	NA	1	2	1	3	3	2	2	3	3	2	4	35	5.3	476	495	0
724	124	66	12	NA	NA	1	2	90	9	5	2	2	NA	NA	NA	11	25	1.1	476	495	0
724	124	67	12	NA	NA	1	2	1	4	4	2	2	NA	2	2	88	15	0.2	476	495	0
563	97	71	11	NA	NA	2	19	1	4	4	2	2	NA	5	2	88	20	1.2	525	513	4
563	97	72	11	NA	NA	1	2	1	4	4	3	3	NA	5	2	88	25	2	525	513	4
563	97	73	11	NA	NA	1	2	1	5	4	3	3	NA	1	3	4	25	1.2	525	513	4
563	97	74	11	NA	NA	1	2	1	1	3	2	2	2	7	2	5	20	0.7	525	513	4
563	97	75	11	NA	NA	1	2	1	4	4	2	2	NA	6	2	4	30	2.6	525	513	4
563	97	76	11	NA	NA	1	2	1	3	3	3	3	0	1	3	88	15	0.1	525	513	4
563	97	77	11	NA	NA	1	2	1	4	4	2	2	NA	2	2	88	20	0.8	525	513	4
563	97	78	11	NA	NA	1	2	1	3	3	2	2	0	4	3	88	20	0.8	525	513	4
563	97	79	11	NA	NA	1	2	1	4	4	2	2	NA	3	2	4	20	0.7	525	513	4
563	97	80	11	NA	NA	1	2	1	5	4	4	4	NA	0	1	88	20	1	525	513	4
563	97	81	11	NA	NA	1	2	90	9	5	2	2	NA	NA	NA	11	25	2.6	525	513	4
563	97	82	11	NA	NA	1	2	1	5	4	2	2	NA	4	1	5	25	2.2	525	513	4
563	97	83	11	NA	NA	1	2	1	7	3	2	2	1	1	3	88	20	0.5	525	513	4
563	97	84	11	NA	NA	1	2	90	9	5	1	1	NA	NA	NA	11	15	0.2	525	513	4
563	97	85	11	NA	NA	1	2	1	4	4	2	2	NA	3	2	88	25	1.4	525	513	4
563	97	86	11	NA	NA	1	2	1	3	3	1	1	1	2	3	5	15	0.3	525	513	4
563	97	87	11	NA	NA	6	5	1	5	4	1	1	NA	NA	NA	88	30	2.7	525	513	4
604	104	88	1	5	NA	2	19	1	1	3	2	2	1	9	3	4	25	1.9	494	492	10
604	104	89	1	5	NA	1	2	90	9	5	2	2	NA	NA	NA	10	15	0.2	494	492	10
604	104	90	1	5	NA	1	7	1	1	3	1	1	1	3	3	88	15	0.1	494	492	10
873	142	91	12	NA	NA	3	6	1	3	3	1	1	3	4	2	4	25	1.5	476	495	3
873	142	92	12	NA	NA	1	2	1	1	3	1	1	3	6	2	10	20	0.3	476	495	3
873	142	93	12	NA	NA	1	2	90	9	5	1	1	NA	NA	NA	11	20	1	476	495	3
873	142	94	12	NA	NA	1	2	1	5	4	2	2	NA	4	3	88	25	1	476	495	3
873	142	95	12	NA	NA	1	2	1	5	4	2	2	NA	4	1	88	15	0.3	476	495	3
873	142	96	12	NA	NA	1	7	90	9	5	1	1	NA	NA	NA	11	20	0.8	476	495	3
208	32	97	4	1	NA	1	7	90	9	5	1	1	NA	NA	NA	11	15	0.5	517	495	4
208	32	98	4	1	NA	1	2	1	5	4	2	2	NA	5	3	88	25	2	517	495	4
208	32	99	4	1	NA	7	3	1	3	3	1	1	1	2	3	5	20	0.6	517	495	4
171	22	100	10	NA	NA	2	19	1	4	4	2	2	NA	2	2	5	25	2	510	522	1
171	22	101	10	NA	NA	2	1	1	5	4	3	3	NA	2	2	88	20	0.5	510	522	1

Table D.1 (cont'd)

171	22	102	10	NA	NA	1	2	90	9	5	1	NA	NA	NA	NA	11	15	0.3	510	522	1
171	22	103	10	NA	NA	1	2	90	9	5	1	NA	NA	NA	NA	11	15	0.3	510	522	1
171	22	104	10	NA	NA	2	19	90	9	5	1	NA	NA	NA	NA	11	15	0.5	510	522	1
171	22	105	10	NA	NA	1	2	1	3	3	2	1	2	3	2	5	20	1.1	510	522	1
171	22	106	10	NA	NA	1	2	1	5	4	1	NA	4	NA	3	88	15	0.3	510	522	1
171	22	107	10	NA	NA	1	2	1	1	3	3	1	4	3	1	5	25	0.9	510	522	1
171	22	108	10	NA	NA	1	2	1	4	4	1	NA	2	NA	2	2	15	0.4	510	522	1
171	22	109	10	NA	NA	1	2	1	5	4	2	NA	3	NA	1	5	25	1.5	510	522	1
171	22	110	10	NA	NA	1	2	90	9	5	1	NA	NA	NA	NA	11	15	0.1	510	522	1
171	22	111	10	NA	NA	1	2	1	4	4	2	NA	3	NA	2	88	25	1.5	510	522	1
171	22	112	10	NA	NA	2	1	1	5	4	3	NA	1	NA	1	88	20	0.4	510	522	1
171	22	113	10	NA	NA	1	18	1	4	4	2	NA	2	NA	2	88	25	1.1	510	522	1
171	22	114	10	NA	NA	4	3	1	4	4	2	NA	5	NA	2	88	30	4	510	522	1
171	22	115	10	NA	NA	4	3	1	4	4	3	NA	3	NA	2	88	35	3.3	510	522	1
134	33	116	4	1	NA	1	7	1	1	3	2	0	5	2	1	4	25	1.7	518	494	4
134	33	117	4	1	NA	12	6	1	1	3	2	1	1	3	3	5	30	2	518	494	4
134	33	118	4	1	NA	1	7	1	5	4	4	NA	0	NA	1	88	20	1.1	518	494	4
134	33	119	4	1	NA	2	19	90	9	5	1	NA	NA	NA	NA	11	15	0.5	518	494	4
134	33	120	4	1	NA	1	2	90	9	5	1	NA	NA	NA	NA	11	15	0.5	518	494	4
134	33	121	4	1	NA	1	2	90	9	5	1	NA	NA	NA	NA	11	20	1.9	518	494	4
134	33	122	4	1	NA	1	2	90	9	5	2	NA	NA	NA	NA	11	20	1.1	518	494	4
134	33	123	4	1	NA	1	2	1	5	4	1	NA	4	NA	1	4	25	0.9	518	494	4
134	33	124	4	1	NA	4	3	1	3	3	3	0	1	2	2	88	35	5	518	494	4
134	33	125	4	1	NA	4	3	1	1	3	2	0	3	2	1	88	20	0.8	518	494	4
134	33	126	4	1	NA	4	3	1	1	3	2	0	2	2	1	88	25	0.9	518	494	4
134	33	127	4	1	NA	1	2	90	9	5	2	NA	NA	NA	NA	88	35	9.3	518	494	4
500	87	128	4	1	5	7	3	1	5	4	1	NA	4	NA	1	4	35	3.8	517	495	8
500	87	129	4	1	5	1	2	1	1	3	2	0	1	3	3	88	20	0.9	517	495	8
500	87	130	4	1	5	2	19	1	1	3	1	0	1	3	1	88	10	0.1	517	495	8
500	87	131	4	1	5	1	2	1	4	4	2	NA	2	NA	2	4	20	0.6	517	495	8
500	87	132	4	1	5	1	2	1	4	4	1	NA	4	NA	2	10	20	0.5	517	495	8
500	87	133	4	1	5	1	2	1	5	4	4	NA	0	NA	1	88	20	0.5	517	495	8
668	116	134	11	NA	NA	1	7	1	4	4	2	NA	3	NA	2	4	25	3.4	525	513	7
668	116	135	11	NA	NA	2	19	1	1	3	2	0	1	3	1	88	15	0.1	525	513	7

Table D.1 (cont'd)

668	116	136	11	NA	NA	2	19	1	1	1	3	2	1	1	6	3	1	5	30	2.8	525	513	7
458	78	137	3	2	NA	1	3	1	1	1	3	1	2	3	4	2	3	4	30	2.6	499	514	7
803	131	138	11	NA	NA	1	2	1	3	3	3	2	0	1	3	3	2	2	30	2.4	524	513	4
803	131	139	11	NA	NA	1	2	1	4	4	4	1	NA	3	NA	2	88	25	1.1	524	513	4	
803	131	140	11	NA	NA	2	19	1	3	3	3	1	0	5	3	2	88	15	0.3	524	513	4	
17	3	141	5	NA	NA	2	19	1	1	1	3	3	0	2	3	3	88	35	4	506	486	1	
17	3	142	5	NA	NA	1	2	1	5	4	4	3	NA	1	NA	2	88	30	2.6	506	486	1	
17	3	143	5	NA	NA	1	2	90	9	9	5	2	NA	NA	NA	NA	11	30	3.5	506	486	1	
17	3	144	5	NA	NA	1	2	1	3	3	3	3	2	3	2	2	4	40	3.8	506	486	1	
17	3	145	5	NA	NA	1	2	90	9	9	5	1	NA	NA	NA	NA	11	15	0.6	506	486	1	
17	3	146	5	NA	NA	1	2	1	3	3	3	3	3	1	3	2	88	30	1.7	506	486	1	
17	3	147	5	NA	NA	2	19	1	4	4	4	3	NA	2	NA	2	88	20	1.6	506	486	1	
17	3	148	5	NA	NA	1	2	1	4	4	4	2	NA	2	NA	2	88	15	0.2	506	486	1	
17	3	149	5	NA	NA	2	19	1	4	4	4	1	NA	4	NA	2	88	20	0.9	506	486	1	
17	3	150	5	NA	NA	1	2	1	1	1	3	2	2	3	2	3	5	25	2.4	506	486	1	
17	3	151	5	NA	NA	1	2	90	9	9	5	1	NA	NA	NA	NA	11	15	0.3	506	486	1	
17	3	152	5	NA	NA	1	2	1	3	3	3	1	1	5	3	2	88	20	0.4	506	486	1	
17	3	153	5	NA	NA	1	2	1	3	3	3	2	2	3	3	2	88	20	0.4	506	486	1	
17	3	154	5	NA	NA	1	2	90	9	9	5	1	NA	NA	NA	NA	11	20	0.9	506	486	1	
17	3	155	5	NA	NA	1	2	1	3	3	3	2	0	5	3	2	88	20	0.8	506	486	1	
17	3	156	5	NA	NA	2	19	1	4	4	4	3	NA	1	NA	2	88	20	0.5	506	486	1	
17	3	157	5	NA	NA	1	2	1	3	3	3	1	1	1	3	2	88	15	0.1	506	486	1	
17	3	158	5	NA	NA	1	2	90	9	9	5	1	NA	NA	NA	NA	11	15	0.6	506	486	1	
17	3	159	5	NA	NA	2	19	1	3	3	3	1	1	7	3	2	5	25	0.6	506	486	1	
17	3	160	5	NA	NA	2	19	1	4	4	4	1	NA	1	NA	2	88	20	0.2	506	486	1	
17	3	161	5	NA	NA	1	7	90	9	9	5	2	NA	NA	NA	NA	2	15	0.8	506	486	1	
17	3	162	5	NA	NA	1	7	1	3	3	3	2	2	5	3	2	10	15	0.3	506	486	1	
17	3	163	5	NA	NA	1	7	1	5	4	4	1	NA	5	NA	1	88	15	0.4	506	486	1	
17	3	164	5	NA	NA	1	7	1	5	4	4	3	NA	1	NA	1	88	20	0.5	506	486	1	
17	3	165	5	NA	NA	1	19	1	3	3	3	1	9+	9	3	2	5	25	1.4	506	486	1	
17	3	166	5	NA	NA	1	3	1	1	1	3	1	1	5	3	1	10	15	0.2	506	486	1	
17	3	167	5	NA	NA	1	18	1	1	1	3	1	3	3	3	3	5	30	1.6	506	486	1	
17	3	168	5	NA	NA	2	7	1	5	4	4	1	NA	9	NA	1	2	25	1.7	506	486	1	
313	63	169	3	2	NA	1	2	1	4	4	4	1	NA	9	NA	2	88	20	0.4	499	514	5	

Table D.1 (cont'd)

313	63	170	3	2	NA	1	6	1	1	1	3	3	3	3	2	3	3	88	30	1.8	499	514	5
313	63	171	3	2	NA	4	4	1	5	5	4	3	3	NA	1	NA	3	4	25	1.4	499	514	5
546	99	172	1	5	NA	1	2	1	1	1	3	2	3	3	7	3	3	4	35	3.5	494	492	9
147	35	173	5	NA	NA	3	6	1	5	5	4	1	NA	6	NA	1	88	20	0.8	508	486	6	
147	35	174	5	NA	NA	1	2	1	5	5	4	3	NA	2	NA	2	88	15	0.5	508	486	6	
147	35	175	5	NA	NA	1	2	1	1	1	3	4	1	0	3	1	5	25	1.2	508	486	6	
940	130	176	4	NA	NA	1	2	1	4	4	4	2	NA	9	NA	2	4	40	10.4	516	496	1	
489	81	177	2	NA	NA	1	2	1	4	4	4	1	NA	3	NA	2	88	20	0.6	491	511	3	
489	81	178	2	NA	NA	2	19	1	1	1	3	3	1	3	3	1	88	15	0.1	491	511	3	
54	25	179	5	NA	NA	1	7	1	5	5	4	2	NA	4	NA	3	4	30	3.3	508	486	3	
54	25	180	5	NA	NA	1	7	90	9	9	5	1	NA	NA	NA	NA	11	15	0.4	508	486	3	
54	25	181	5	NA	NA	2	19	1	1	1	3	2	2	5	3	1	5	20	0.6	508	486	3	
54	25	182	5	NA	NA	1	20	90	9	9	5	1	NA	NA	NA	NA	11	15	0.3	508	486	3	
54	25	183	5	NA	NA	1	5	90	9	9	5	1	NA	NA	NA	NA	11	10	0.2	508	486	3	
446	83	184	1	4	NA	6	5	1	1	1	3	1	3	3	3	3	3	88	30	1.4	493	492	7
446	83	185	1	4	NA	4	3	90	9	9	5	1	NA	NA	NA	NA	11	25	2.2	493	492	7	
446	83	186	1	4	NA	4	3	1	4	4	4	1	NA	3	NA	2	3	30	0.9	493	492	7	
446	83	187	1	4	NA	4	3	1	4	4	4	3	NA	1	NA	2	88	25	1.9	493	492	7	
714	108	188	1	5	NA	1	7	1	1	1	3	2	0	1	3	3	3	88	20	0.8	494	492	11
656	96	189	4	NA	NA	1	9	1	4	4	4	2	NA	3	NA	2	88	15	0.2	519	496	1	
656	96	190	4	NA	NA	1	2	1	4	4	4	1	NA	5	NA	2	5	20	1.1	519	496	1	
656	96	191	4	NA	NA	1	2	1	4	4	4	3	NA	4	NA	2	88	30	3.2	519	496	1	
656	96	192	4	NA	NA	1	2	1	4	4	4	3	NA	2	NA	2	88	20	0.7	519	496	1	
656	96	193	4	NA	NA	1	2	1	4	4	4	3	NA	3	NA	2	88	20	0.6	519	496	1	
656	96	194	4	NA	NA	1	2	1	4	4	4	2	NA	9	NA	2	88	40	2.4	519	496	1	
656	96	195	4	NA	NA	1	2	1	5	5	4	1	NA	1	NA	3	88	20	0.3	519	496	1	
656	96	196	4	NA	NA	1	2	90	9	9	5	2	NA	NA	NA	NA	11	30	3.8	519	496	1	
529	92	197	1	4	NA	1	2	1	4	4	4	1	NA	3	NA	2	88	20	0.8	493	492	8	
529	92	198	1	4	NA	7	4	1	4	4	4	1	NA	4	NA	2	5	35	3.4	493	492	8	
529	92	199	1	4	NA	7	4	1	4	4	4	1	NA	8	NA	2	4	40	9.7	493	492	8	
480	88	200	11	NA	NA	2	19	1	5	5	4	1	NA	6	NA	1	88	20	0.7	525	513	3	
480	88	201	11	NA	NA	1	2	1	4	4	4	1	NA	2	NA	2	88	20	0.3	525	513	3	
480	88	202	11	NA	NA	1	2	90	9	9	5	2	NA	NA	NA	NA	88	20	1.2	525	513	3	
480	88	203	11	NA	NA	1	2	1	4	4	4	2	NA	5	NA	2	88	20	0.9	525	513	3	

Table D.1 (cont'd)

480	88	204	11	NA	NA	1	2	1	5	4	3	NA	2	NA	3	88	20	0.8	525	513	3
480	88	205	11	NA	NA	1	2	1	5	4	2	NA	5	NA	1	88	30	1.1	525	513	3
480	88	206	11	NA	NA	1	2	1	5	4	3	NA	1	NA	1	88	20	0.2	525	513	3
480	88	207	11	NA	NA	1	18	1	1	3	1	1	4	3	3	88	25	0.5	525	513	3
480	88	208	11	NA	NA	1	19	1	4	4	3	NA	2	NA	2	88	25	1.3	525	513	3
480	88	209	11	NA	NA	4	3	1	1	3	1	1	3	3	1	88	25	1.1	525	513	3
775	125	210	12	NA	NA	3	7	1	7	3	3	1	4	3	3	5	30	2.3	476	495	1
775	125	211	12	NA	NA	3	7	1	3	3	1	1	3	2	2	1	25	0.9	476	495	1
775	125	212	12	NA	NA	1	2	90	9	5	2	NA	NA	NA	NA	11	25	0.7	476	495	1
775	125	213	12	NA	NA	2	19	1	4	4	2	NA	1	NA	2	88	20	0.3	476	495	1
775	125	214	12	NA	NA	2	19	90	9	5	2	NA	NA	NA	NA	11	20	0.4	476	495	1
775	125	215	12	NA	NA	2	19	1	4	4	1	NA	4	NA	2	88	15	0.1	476	495	1
775	125	216	12	NA	NA	2	19	1	5	4	3	NA	5	NA	3	4	20	1.5	476	495	1
775	125	217	12	NA	NA	2	19	1	4	4	3	NA	3	NA	2	88	30	2.9	476	495	1
775	125	218	12	NA	NA	1	2	1	4	4	2	NA	3	NA	2	88	25	1.9	476	495	1
775	125	219	12	NA	NA	2	19	1	5	4	2	NA	3	NA	3	88	25	0.8	476	495	1
775	125	220	12	NA	NA	2	19	1	1	3	1	2	8	3	1	5	20	0.9	476	495	1
775	125	221	12	NA	NA	4	3	1	5	4	2	NA	1	NA	1	5	25	1.4	476	495	1
775	125	222	12	NA	NA	1	17	90	9	5	1	NA	NA	NA	NA	11	15	0.5	476	495	1
471	91	223	3	2	NA	3	7	1	5	4	1	NA	1	NA	1	88	20	0.7	499	514	8
471	91	224	3	2	NA	1	11	1	1	3	2	0	7	3	1	4	25	1.8	499	514	8
518	93	225	1	5	NA	4	3	1	5	4	2	NA	2	NA	3	88	55	7.3	494	492	8
518	93	226	1	5	NA	4	3	1	1	3	3	2	0	3	1	88	25	0.7	494	492	8
32	4	227	2	NA	NA	1	2	1	1	3	2	0	2	3	3	1	25	0.7	489	511	1
1	6	228	2	NA	NA	2	1	90	9	5	1	NA	NA	NA	NA	11	15	0.4	491	511	1
350	72	229	3	2	NA	1	7	1	4	4	2	NA	4	NA	2	4	20	0.6	499	514	6
618	102	230	11	NA	NA	2	19	1	5	4	2	NA	6	NA	3	88	25	1.3	525	513	5
618	102	231	11	NA	NA	2	19	1	5	4	2	NA	6	NA	3	88	25	1.3	525	513	5
618	102	232	11	NA	NA	1	2	1	4	4	2	NA	6	NA	2	88	20	0.2	525	513	5
618	102	233	11	NA	NA	2	19	1	3	4	1	1	5	3	2	1	20	0.5	525	513	5
618	102	234	11	NA	NA	4	3	1	4	4	1	NA	4	NA	2	4	50	4.9	525	513	5
211	45	235	10	NA	NA	1	18	1	5	4	2	NA	4	NA	3	88	15	0.2	510	522	2
211	45	236	10	NA	NA	1	2	90	9	5	2	NA	NA	NA	NA	88	20	0.8	510	522	2
211	45	237	10	NA	NA	1	3	1	5	4	1	NA	3	NA	3	88	20	0.2	510	522	2

Table D.1 (cont'd)

211	45	238	10	NA	NA	2	19	1	5	4	3	NA	3	NA	1	88	20	0.5	510	522	2
211	45	239	10	NA	NA	1	2	1	5	4	2	NA	5	NA	4	88	25	0.7	510	522	2
555	100	240	1	4	NA	2	19	1	5	4	4	NA	0	NA	1	88	20	0.4	493	492	9
555	100	241	1	4	NA	1	2	1	4	4	1	NA	3	NA	2	88	15	0.2	493	492	9
555	100	242	1	4	NA	1	2	1	4	4	1	NA	6	NA	2	88	15	0.1	493	492	9
258	19	243	2	NA	NA	1	3	1	1	3	2	1	5	3	3	88	15	0.3	489	511	2
258	19	244	2	NA	NA	2	19	1	1	1	2	2	4	2	1	3	35	0.9	489	511	2
378	74	245	1	5	NA	2	19	1	4	4	1	NA	3	NA	2	88	15	0.1	494	492	6
378	74	246	1	5	NA	4	3	1	1	3	2	0	1	3	1	88	40	3.6	494	492	6
42	9	247	2	NA	NA	4	3	1	1	3	2	1	2	3	1	88	60	14.6	491	511	2
42	9	248	2	NA	NA	1	15	1	5	4	1	NA	5	NA	3	88	20	1.1	491	511	2
42	9	249	2	NA	NA	2	19	1	5	4	1	NA	5	NA	1	3	20	0.4	491	511	2
42	9	250	2	NA	NA	1	7	1	1	3	1	1	3	3	1	10	20	0.1	491	511	2
42	9	251	2	NA	NA	1	2	1	1	3	1	2	7	3	1	10	20	0.4	491	511	2
42	9	252	2	NA	NA	1	2	1	5	4	1	NA	3	NA	3	88	35	2	491	511	2
766	118	253	5	NA	NA	1	2	1	4	4	1	NA	1	NA	2	88	15	0.1	505	483	1
766	118	254	5	NA	NA	1	2	90	9	5	1	NA	NA	NA	NA	11	25	1.8	505	483	1
792	126	255	4	NA	NA	3	6	1	3	3	1	2	9	2	2	4	30	3.6	519	496	3
792	126	256	4	NA	NA	3	3	1	1	3	2	0	6	3	1	88	20	1.1	519	496	3
918	143	257	2	NA	NA	1	4	1	5	2	1	NA	6	NA	1	88	15	0.4	489	511	7
918	143	258	2	NA	NA	1	2	90	9	5	1	NA	NA	NA	NA	11	20	0.8	489	511	7
585	98	259	5	NA	NA	3	3	1	1	3	2	1	3	3	1	5	40	5	506	487	2
585	98	260	5	NA	NA	12	3	1	5	4	1	NA	5	NA	1	88	20	1.4	506	487	2
585	98	261	5	NA	NA	2	1	1	3	3	1	1	4	3	2	88	20	1	506	487	2
585	98	262	5	NA	NA	1	2	1	4	4	4	NA	0	NA	2	88	35	3.2	506	487	2
585	98	263	5	NA	NA	1	2	1	1	3	2	1	7	3	1	88	20	1.4	506	487	2
585	98	264	5	NA	NA	1	7	1	1	3	2	1	8	3	1	4	20	0.5	506	487	2
585	98	265	5	NA	NA	2	19	1	3	3	2	0	7	3	2	88	20	1.2	506	487	2
585	98	266	5	NA	NA	2	19	1	3	3	2	1	3	3	2	88	20	0.3	506	487	2
585	98	267	5	NA	NA	1	3	1	5	4	1	NA	5	NA	3	4	35	3.6	506	487	2
836	112	268	1	5	NA	1	2	1	1	3	1	2	9	3	1	4	35	3.2	494	492	12
836	112	269	1	5	NA	2	19	1	4	4	1	NA	6	NA	2	88	20	0.5	494	492	12
836	112	270	1	5	NA	1	2	1	4	4	1	NA	4	NA	2	88	15	0.3	494	492	12
836	112	271	1	5	NA	1	2	90	9	5	1	NA	NA	NA	NA	11	15	0.1	494	492	12

Table D.1 (cont'd)

836	112	272	1	5	NA	6	5	1	4	4	2	NA	4	NA	1	4	30	1.5	494	492	12
705	107	273	1	4	NA	12	2	1	5	4	3	NA	1	NA	3	88	20	0.8	493	492	11
705	107	274	1	4	NA	4	3	1	1	3	3	1	1	2	1	88	40	4.7	493	492	11
114	17	275	4	1	NA	3	6	1	5	4	1	NA	4	NA	1	4	35	6.2	518	494	3
194	36	276	4	1	NA	1	7	1	4	2	1	NA	9	NA	2	2	20	1.3	518	494	5
194	36	277	4	1	NA	1	15	1	3	3	2	0	2	3	2	88	20	0.4	518	494	5
194	36	278	4	1	NA	4	3	1	1	3	1	1	2	3	1	5	30	1.5	518	494	5
194	36	279	4	1	NA	4	3	1	4	4	1	NA	4	NA	2	88	20	0.5	518	494	5
194	36	280	4	1	NA	2	19	1	4	4	1	NA	7	NA	2	5	30	1.6	518	494	5
116	30	281	5	NA	NA	1	5	1	3	3	2	0	4	3	2	4	20	0.8	506	486	5
116	30	282	5	NA	NA	2	19	1	3	3	2	2	2	3	2	88	20	0.2	506	486	5
116	30	283	5	NA	NA	1	2	1	4	4	1	NA	4	NA	2	88	20	1.1	506	486	5
116	30	284	5	NA	NA	1	2	1	4	4	2	NA	4	NA	2	88	20	0.7	506	486	5
571	80	285	11	NA	NA	1	5	1	4	4	3	NA	1	NA	2	88	25	0.9	524	513	1
571	80	286	11	NA	NA	1	2	1	4	4	1	NA	9	NA	2	88	25	2.1	524	513	1
571	80	287	11	NA	NA	1	15	1	5	4	3	NA	3	NA	1	88	20	0.8	524	513	1
571	80	288	11	NA	NA	1	5	1	4	4	2	NA	1	NA	2	88	15	0.3	524	513	1
571	80	289	11	NA	NA	3	6	1	3	3	1	1	3	2	2	88	20	0.5	524	513	1
571	80	290	11	NA	NA	2	19	1	1	3	2	2	8	3	1	4	30	1.7	524	513	1
571	80	291	11	NA	NA	2	19	1	1	3	2	2	8	3	1	4	25	0.8	524	513	1
571	80	292	11	NA	NA	1	2	1	5	4	3	NA	3	NA	1	88	25	0.9	524	513	1
571	80	293	11	NA	NA	1	2	1	1	3	3	3	3	3	1	88	30	3.2	524	513	1
571	80	294	11	NA	NA	1	2	1	4	4	1	NA	4	NA	2	3	15	0.1	524	513	1
571	80	295	11	NA	NA	1	2	1	4	5	4	NA	0	NA	1	88	25	0.6	524	513	1
571	80	296	11	NA	NA	1	2	1	1	3	2	5	6	3	1	4	35	4.7	524	513	1
571	80	297	11	NA	NA	1	2	1	4	4	1	NA	5	NA	2	88	25	0.3	524	513	1
571	80	298	11	NA	NA	2	19	1	5	4	3	NA	3	NA	3	88	20	0.4	524	513	1
571	80	299	11	NA	NA	1	3	1	4	4	1	NA	7	NA	2	88	20	0.7	524	513	1
571	80	300	11	NA	NA	1	2	1	5	4	2	NA	2	NA	2	88	25	0.2	524	513	1
571	80	301	11	NA	NA	1	5	1	5	4	1	NA	2	NA	3	88	15	0.1	524	513	1
571	80	302	11	NA	NA	1	2	1	4	4	2	NA	4	NA	2	88	20	0.6	524	513	1
571	80	303	11	NA	NA	4	3	1	3	3	1	1	6	3	2	4	40	5	524	513	1
571	80	304	11	NA	NA	4	3	1	5	4	2	0	3	NA	3	5	50	11.5	524	513	1
571	80	305	11	NA	NA	2	1	1	1	3	2	0	5	1	1	2	25	1.5	524	513	1

Table D.1 (cont'd)

571	80	306	11	NA	NA	1	2	1	4	4	1	NA	9	NA	2	88	25	1.7	524	513	1
571	80	307	11	NA	NA	1	2	1	1	3	2	2	6	3	1	4	35	2.7	524	513	1
571	80	308	11	NA	NA	2	19	1	4	2	1	NA	7	NA	2	2	25	0.9	524	513	1
571	80	309	11	NA	NA	4	3	1	3	3	1	1	7	2	2	88	25	2	524	513	1
571	80	310	11	NA	NA	2	19	1	5	4	3	NA	1	NA	1	88	25	1.1	524	513	1
571	80	311	11	NA	NA	3	6	1	4	4	1	NA	4	NA	2	88	20	1	524	513	1
571	80	312	11	NA	NA	1	2	1	4	4	1	NA	1	NA	2	88	25	0.7	524	513	1
571	80	313	11	NA	NA	2	3	1	1	3	2	1	5	3	3	88	25	0.5	524	513	1
571	80	314	11	NA	NA	2	19	1	3	3	2	1	2	3	2	88	20	0.3	524	513	1
571	80	315	11	NA	NA	2	19	1	5	4	2	NA	3	NA	1	88	25	0.5	524	513	1
571	80	316	11	NA	NA	2	1	1	4	4	2	NA	1	NA	2	88	15	0.1	524	513	1
571	80	317	11	NA	NA	7	4	1	3	3	1	2	7	2	2	88	25	0.8	524	513	1
571	80	318	11	NA	NA	1	2	1	1	3	1	1	6	2	1	6	15	0.2	524	513	1
571	80	319	11	NA	NA	1	2	1	4	4	2	NA	3	NA	2	88	20	0.6	524	513	1
571	80	320	11	NA	NA	2	1	90	9	5	3	NA	NA	NA	NA	11	25	1.5	524	513	1
571	80	321	11	NA	NA	1	2	90	9	5	1	NA	NA	NA	NA	11	15	0.3	524	513	1
571	80	322	11	NA	NA	1	2	1	1	3	1	6	3	2	1	6	20	0.8	524	513	1
571	80	323	11	NA	NA	1	2	90	9	5	1	NA	NA	NA	NA	11	20	0.2	524	513	1
571	80	324	11	NA	NA	1	2	1	4	4	3	NA	2	NA	2	88	20	1.2	524	513	1
571	80	325	11	NA	NA	7	7	1	4	4	1	NA	2	NA	2	88	15	0.1	524	513	1
571	80	326	11	NA	NA	2	19	1	1	3	2	0	7	1	1	88	15	0.2	524	513	1
571	80	327	11	NA	NA	1	7	1	5	4	4	NA	0	NA	1	88	15	0.1	524	513	1
571	80	328	11	NA	NA	1	2	1	3	3	1	2	3	2	1	88	20	0.2	524	513	1
571	80	329	11	NA	NA	2	19	90	9	5	3	NA	NA	NA	NA	11	15	0.5	524	513	1
571	80	330	11	NA	NA	1	2	1	4	4	2	NA	5	NA	2	88	20	0.2	524	513	1
571	80	331	11	NA	NA	1	2	1	1	3	1	1	4	2	1	88	15	0.1	524	513	1
571	80	332	11	NA	NA	1	2	1	4	4	2	NA	3	NA	2	88	15	0.1	524	513	1
571	80	333	11	NA	NA	1	2	1	4	4	1	NA	5	NA	2	88	15	0.2	524	513	1
571	80	334	11	NA	NA	1	2	1	5	4	1	NA	3	NA	1	88	15	0.1	524	513	1
571	80	335	11	NA	NA	2	19	1	4	4	2	NA	1	NA	2	88	15	0.1	524	513	1
105	16	336	4	1	NA	1	2	1	5	4	4	NA	0	NA	1	88	60	32.2	517	495	3
105	16	337	4	1	NA	1	8	1	4	4	1	NA	3	NA	2	88	15	0.1	517	495	3
47	24	338	5	NA	NA	1	7	1	1	3	1	1	3	3	1	88	15	0.1	506	486	3
47	24	339	5	NA	NA	1	3	1	3	3	1	1	5	2	2	88	20	0.2	506	486	3

Table D.1 (cont'd)

266	44	340	4	1	NA	1	2	1	1	1	3	3	2	2	3	1	88	25	1	518	494	6
266	44	341	4	1	NA	1	2	1	1	5	4	4	NA	0	NA	3	88	25	0.9	518	494	6
266	44	342	4	1	NA	1	2	1	1	5	4	2	NA	5	NA	3	88	20	0.7	518	494	6
266	44	343	4	1	NA	2	19	90	9	9	5	1	NA	NA	NA	NA	11	20	0.6	518	494	6
266	44	344	4	1	NA	4	3	1	3	3	3	2	1	2	2	2	88	20	0.3	518	494	6
266	44	345	4	1	NA	4	3	1	4	4	4	2	NA	2	NA	2	88	20	0.5	518	494	6
266	44	346	4	1	NA	1	2	1	5	5	4	2	NA	1	NA	3	88	20	0.2	518	494	6
266	44	347	4	1	NA	4	3	1	1	1	3	3	0	4	2	3	88	30	1.8	518	494	6
266	44	348	4	1	NA	7	5	1	4	4	4	1	NA	2	NA	2	4	40	7.7	518	494	6
895	137	349	11	NA	NA	1	2	1	1	1	3	3	0	1	3	3	88	30	3	524	514	3
895	137	350	11	NA	NA	3	7	1	5	5	4	1	NA	1	NA	1	88	20	0.4	524	514	3
895	137	351	11	NA	NA	1	2	1	1	1	4	1	3	4	2	3	10	20	0.6	524	514	3
895	137	352	11	NA	NA	1	2	90	9	9	5	2	NA	NA	NA	NA	11	35	5.3	524	514	3
895	137	353	11	NA	NA	1	2	1	4	4	4	3	NA	1	NA	2	88	20	0.9	524	514	3
895	137	354	11	NA	NA	1	7	90	9	9	5	1	NA	NA	NA	NA	11	15	0.5	524	514	3
895	137	355	11	NA	NA	1	7	1	1	1	3	1	1	2	3	3	88	20	0.5	524	514	3
895	137	356	11	NA	NA	1	2	1	4	4	4	4	NA	0	NA	2	88	25	1.9	524	514	3
895	137	357	11	NA	NA	1	2	1	1	1	3	1	1	5	2	1	88	25	0.9	524	514	3
895	137	358	11	NA	NA	1	2	1	1	1	3	3	1	2	1	1	2	30	3.1	524	514	3
895	137	359	11	NA	NA	15	1	90	9	9	5	1	NA	NA	NA	NA	11	20	0.6	524	514	3
69	26	360	5	NA	NA	1	2	1	1	1	3	1	1	2	3	3	88	20	0.7	506	486	4
84	27	361	5	NA	NA	1	2	1	1	1	3	4	0	0	3	1	88	25	1	508	486	4
84	27	362	5	NA	NA	1	2	1	4	4	4	2	NA	3	NA	2	88	20	0.3	508	486	4
84	27	363	5	NA	NA	1	2	1	4	4	4	1	NA	2	NA	2	88	15	0.1	508	486	4
696	113	364	5	NA	NA	2	19	1	4	4	4	1	NA	6	NA	2	88	25	1.3	505	483	1
696	113	365	5	NA	NA	3	6	1	1	1	3	1	3	9	2	1	6	25	1.3	505	483	1
696	113	366	5	NA	NA	3	6	1	1	1	3	1	1	5	3	1	88	20	0.4	505	483	1
696	113	367	5	NA	NA	2	19	1	3	3	1	2	5	5	3	2	1	35	2.5	505	483	1
661	105	368	11	NA	NA	12	7	1	1	1	3	1	3	3	2	1	4	30	2.3	524	513	2
661	105	369	11	NA	NA	1	4	1	5	5	4	1	NA	3	NA	3	88	20	0.5	524	513	2
661	105	370	11	NA	NA	4	3	1	1	1	3	2	0	7	3	1	88	20	1	524	513	2
661	105	371	11	NA	NA	1	2	1	3	3	3	4	0	0	3	2	88	35	3.8	524	513	2
661	105	372	11	NA	NA	2	19	90	9	9	5	2	NA	NA	NA	NA	11	25	1.4	524	513	2
661	105	373	11	NA	NA	1	4	1	1	1	3	2	2	5	3	1	4	30	1.3	524	513	2

Table D.1 (cont'd)

661	105	374	11	NA	NA	1	2	1	5	4	1	NA	5	NA	1	88	20	0.8	524	513	2
661	105	375	11	NA	NA	1	20	1	5	4	3	NA	5	NA	1	88	20	1	524	513	2
661	105	376	11	NA	NA	1	2	1	1	3	1	2	5	2	1	88	15	0.2	524	513	2
661	105	377	11	NA	NA	12	7	1	1	3	4	0	0	3	3	88	15	0.1	524	513	2
661	105	378	11	NA	NA	1	2	1	4	4	1	NA	4	NA	2	88	25	1.3	524	513	2
661	105	379	11	NA	NA	2	19	1	3	3	2	0	3	2	2	88	25	0.7	524	513	2
661	105	380	11	NA	NA	1	2	1	4	4	1	NA	4	NA	2	88	25	0.5	524	513	2
661	105	381	11	NA	NA	1	2	1	4	4	2	NA	3	NA	2	88	25	1.5	524	513	2
661	105	382	11	NA	NA	2	19	1	4	4	1	NA	3	NA	2	88	15	0.2	524	513	2
661	105	383	11	NA	NA	1	2	1	1	3	1	1	5	3	1	88	15	0.1	524	513	2
661	105	384	11	NA	NA	2	1	1	1	3	3	0	3	3	3	88	20	0.5	524	513	2
661	105	385	11	NA	NA	1	2	1	4	4	1	NA	5	NA	2	88	15	0.1	524	513	2
661	105	386	11	NA	NA	2	19	1	1	3	2	0	3	3	1	88	20	0.4	524	513	2
661	105	387	11	NA	NA	1	2	1	3	3	1	1	7	3	2	4	20	0.4	524	513	2
661	105	388	11	NA	NA	1	2	90	9	5	1	NA	NA	NA	NA	11	15	0.1	524	513	2
661	105	389	11	NA	NA	1	2	1	4	4	1	NA	5	NA	2	88	15	0.1	524	513	2
661	105	390	11	NA	NA	2	19	1	1	3	3	1	2	3	1	88	20	0.4	524	513	2
661	105	391	11	NA	NA	1	2	1	1	2	2	0	5	1	1	2	30	4.3	524	513	2
933	62	392	7	NA	NA	2	19	1	1	3	2	1	5	3	1	4	25	1.5	484	493	1
933	62	393	7	NA	NA	4	3	1	1	3	2	0	1	2	1	88	15	0.2	484	493	1
933	62	394	7	NA	NA	4	3	1	1	3	2	0	2	3	1	88	20	0.3	484	493	1
933	62	395	7	NA	NA	1	4	1	5	4	1	NA	6	NA	3	88	15	0.1	484	493	1
933	62	396	7	NA	NA	1	2	90	9	5	2	NA	NA	NA	NA	11	25	2.8	484	493	1
933	62	397	7	NA	NA	1	2	90	9	5	1	NA	NA	NA	NA	11	25	1.4	484	493	1
933	62	398	7	NA	NA	2	19	1	1	3	2	1	3	3	3	88	20	0.5	484	493	1
927	61	399	7	NA	NA	1	2	1	5	4	1	NA	4	NA	2	88	30	1.4	484	495	1
927	61	400	7	NA	NA	3	6	1	1	3	1	1	5	3	3	4	30	2.9	484	495	1
927	61	401	7	NA	NA	1	2	90	9	5	2	NA	NA	NA	NA	11	35	5.8	484	495	1
927	61	402	7	NA	NA	7	5	1	3	3	3	0	3	1	2	88	20	1.1	484	495	1
927	61	403	7	NA	NA	1	2	1	5	4	1	NA	9	NA	1	4	25	2.2	484	495	1
927	61	404	7	NA	NA	1	2	1	1	3	1	1	7	3	1	88	25	1.2	484	495	1
927	61	405	7	NA	NA	1	2	1	1	3	2	2	7	3	3	4	20	1.4	484	495	1
927	61	406	7	NA	NA	1	2	1	4	4	1	NA	4	NA	2	88	20	0.3	484	495	1
927	61	407	7	NA	NA	1	2	1	3	3	1	1	7	3	2	5	25	0.9	484	495	1

Table D.1 (cont'd)

927	61	408	7	NA	NA	1	2	1	1	1	3	2	4	7	2	1	4	25	2.2	484	495	1
65	18	409	4	1	NA	2	19	1	5	5	4	3	NA	3	NA	1	88	45	3.3	518	494	2
303	40	410	5	NA	NA	4	3	1	4	4	4	4	NA	0	NA	2	88	70	10.7	506	486	7
303	40	411	5	NA	NA	4	3	1	1	1	3	1	1	4	2	1	88	50	7.4	506	486	7
303	40	412	5	NA	NA	4	3	1	5	5	3	4	NA	0	NA	1	88	55	7	506	486	7
303	40	413	5	NA	NA	1	2	1	5	5	4	1	NA	6	NA	1	88	25	1	506	486	7
303	40	414	5	NA	NA	2	19	1	1	1	3	1	1	5	3	3	88	20	0.1	506	486	7
303	40	415	5	NA	NA	1	2	1	4	4	4	1	NA	5	NA	2	88	15	0.2	506	486	7
303	40	416	5	NA	NA	2	19	1	5	5	4	1	NA	2	NA	3	88	20	0.8	506	486	7
303	40	417	5	NA	NA	1	2	90	9	9	5	1	NA	NA	NA	NA	11	15	0.3	506	486	7
303	40	418	5	NA	NA	1	2	1	3	3	3	2	3	7	2	2	88	20	0.4	506	486	7
303	40	419	5	NA	NA	1	2	1	4	4	4	1	NA	4	NA	2	88	15	0.4	506	486	7
303	40	420	5	NA	NA	2	19	1	1	1	3	2	0	2	3	1	88	15	0.1	506	486	7
303	40	421	5	NA	NA	1	2	1	5	5	4	1	NA	3	NA	1	88	15	0.1	506	486	7
303	40	422	5	NA	NA	1	2	1	5	5	4	1	NA	3	NA	3	88	10	0.1	506	486	7
303	40	423	5	NA	NA	2	19	1	1	1	3	3	1	8	3	1	88	20	1.1	506	486	7
418	58	424	4	1	NA	1	2	1	4	4	4	1	NA	7	NA	2	4	30	2.1	518	494	7
418	58	425	4	1	NA	7	4	1	5	5	4	2	NA	6	NA	1	4	40	6.7	518	494	7
418	58	426	4	1	NA	1	2	1	5	5	4	2	NA	1	NA	1	88	25	0.6	518	494	7
418	58	427	4	1	NA	12	7	1	1	1	3	2	5	4	2	3	88	20	0.4	518	494	7
418	58	428	4	1	NA	1	4	1	1	1	3	3	1	2	3	1	88	25	0.8	518	494	7
859	111	429	1	4	NA	4	3	1	1	1	3	4	0	0	3	3	88	20	0.3	493	492	12
770	121	430	11	NA	NA	4	3	1	3	3	3	3	4	1	3	2	88	35	3.8	524	513	3
770	121	431	11	NA	NA	1	7	90	9	9	5	1	NA	NA	NA	NA	11	15	0.2	524	513	3
770	121	432	11	NA	NA	1	2	1	3	3	3	2	1	3	3	2	88	25	0.9	524	513	3
770	121	433	11	NA	NA	1	7	1	5	5	4	1	NA	6	NA	1	88	10	0.1	524	513	3
770	121	434	11	NA	NA	1	2	1	5	5	4	1	NA	3	NA	1	88	25	0.5	524	513	3
770	121	435	11	NA	NA	2	19	90	9	9	5	1	NA	NA	NA	NA	11	25	2.1	524	513	3
770	121	436	11	NA	NA	1	5	1	4	4	4	2	NA	1	NA	2	88	15	0.2	524	513	3
770	121	437	11	NA	NA	1	2	90	9	9	5	1	NA	NA	NA	NA	11	15	0.3	524	513	3
770	121	438	11	NA	NA	1	2	1	1	1	3	1	1	6	3	1	88	15	0.1	524	513	3
770	121	439	11	NA	NA	1	18	1	4	4	4	1	NA	2	NA	2	2	15	0.3	524	513	3
770	121	440	11	NA	NA	2	19	1	3	3	3	1	1	3	2	2	88	20	0.2	524	513	3
770	121	441	11	NA	NA	2	19	1	4	4	4	2	NA	4	NA	2	88	30	1.1	524	513	3

Table D.1 (cont'd)

770	121	442	11	NA	NA	2	19	1	5	4	1	NA	3	NA	3	88	20	0.2	524	513	3
11	14	443	4	NA	NA	1	5	1	1	3	1	1	7	3	3	88	20	0.8	517	492	1
11	14	444	4	NA	NA	1	2	1	5	4	3	NA	5	NA	1	88	40	6.5	517	492	1
11	14	445	4	NA	NA	1	2	1	5	4	3	NA	7	NA	3	88	40	7.3	517	492	1
11	14	446	4	NA	NA	1	2	90	9	5	1	NA	NA	NA	NA	11	30	5.8	517	492	1
11	14	447	4	NA	NA	1	2	1	5	3	2	NA	8	NA	3	4	25	2.9	517	492	1
11	14	448	4	NA	NA	1	2	90	9	5	1	NA	NA	NA	NA	11	15	0.1	517	492	1
11	14	449	4	NA	NA	1	2	1	1	3	1	2	5	3	3	88	15	0.3	517	492	1
11	14	450	4	NA	NA	3	6	90	9	5	1	NA	NA	NA	NA	11	15	0.4	517	492	1
11	14	451	4	NA	NA	1	2	1	3	3	2	1	5	3	2	88	30	2	517	492	1
11	14	452	4	NA	NA	1	2	1	1	3	1	1	7	3	3	88	25	0.8	517	492	1
11	14	453	4	NA	NA	1	5	1	3	3	1	4	4	3	2	88	25	0.8	517	492	1
11	14	454	4	NA	NA	1	2	1	4	4	1	NA	4	NA	2	88	20	0.4	517	492	1
11	14	455	4	NA	NA	1	2	1	4	4	2	NA	6	NA	2	88	25	1.7	517	492	1
11	14	456	4	NA	NA	2	19	1	1	3	3	0	2	1	3	88	25	3.7	517	492	1
11	14	457	4	NA	NA	2	19	1	3	3	2	1	5	2	2	88	25	1.9	517	492	1
11	14	458	4	NA	NA	2	19	1	4	4	3	NA	1	NA	2	88	25	1.3	517	492	1
11	14	459	4	NA	NA	2	19	1	3	3	1	2	5	2	2	88	20	0.6	517	492	1
11	14	460	4	NA	NA	1	2	1	3	3	2	1	5	3	2	88	25	0.8	517	492	1
11	14	461	4	NA	NA	1	2	1	3	3	2	0	3	2	2	88	20	0.6	517	492	1
11	14	462	4	NA	NA	1	2	1	5	4	2	NA	9	NA	1	4	30	4.4	517	492	1
11	14	463	4	NA	NA	1	2	1	1	2	2	1	9	1	1	2	30	5.4	517	492	1
375	73	464	1	4	NA	4	3	1	5	4	2	NA	3	NA	3	88	30	1.7	493	492	6
375	73	465	1	4	NA	4	3	1	4	4	1	NA	1	NA	2	88	20	0.3	493	492	6
375	73	466	1	4	NA	1	3	1	1	3	4	0	0	3	1	88	25	1	493	492	6
375	73	467	1	4	NA	4	3	1	1	3	4	0	0	3	1	88	20	0.8	493	492	6
221	48	468	1	4	NA	1	3	1	1	3	2	0	3	3	1	88	60	12.5	493	492	3
221	48	469	1	4	NA	1	3	1	3	3	3	1	0	2	2	88	25	0.9	493	492	3
221	48	470	1	4	NA	1	3	1	3	3	1	4	3	2	2	88	15	0.1	493	492	3
221	48	471	1	4	NA	1	2	1	5	4	1	NA	3	NA	3	88	25	1.3	493	492	3
221	48	472	1	4	NA	12	3	1	1	3	3	9+	9	2	3	88	60	10.2	493	492	3
123	31	473	5	NA	NA	3	6	1	3	3	1	4	3	3	2	88	25	1	508	486	5
123	31	474	5	NA	NA	2	19	1	1	3	2	0	2	3	3	88	20	0.7	508	486	5
123	31	475	5	NA	NA	12	8	1	4	4	2	NA	2	NA	2	88	25	0.4	508	486	5

Table D.1 (cont'd)

123	31	476	5	NA	NA	12	8	1	3	3	2	2	7	2	2	1	25	0.9	508	486	5
123	31	477	5	NA	NA	12	8	1	5	4	1	NA	5	NA	3	88	15	0.3	508	486	5
123	31	478	5	NA	NA	12	6	1	5	4	1	NA	6	NA	1	88	20	0.7	508	486	5
123	31	479	5	NA	NA	1	7	1	5	4	1	NA	9	NA	1	88	25	1.4	508	486	5
123	31	480	5	NA	NA	2	19	1	4	4	2	NA	5	NA	2	88	20	0.7	508	486	5
123	31	481	5	NA	NA	1	2	1	3	3	2	2	5	3	2	88	25	1.3	508	486	5
123	31	482	5	NA	NA	2	19	1	5	4	2	NA	5	NA	1	88	20	0.1	508	486	5
123	31	483	5	NA	NA	1	2	90	9	5	1	NA	NA	NA	NA	11	15	0.3	508	486	5
123	31	484	5	NA	NA	1	2	1	3	3	2	0	4	3	2	88	20	1	508	486	5
123	31	485	5	NA	NA	1	2	1	3	3	2	0	4	3	2	88	30	2.4	508	486	5
123	31	486	5	NA	NA	1	11	90	9	5	1	NA	NA	NA	NA	11	15	0.4	508	486	5
123	31	487	5	NA	NA	1	7	1	4	4	3	NA	2	NA	2	88	25	2.3	508	486	5
123	31	488	5	NA	NA	1	8	1	5	4	2	2	6	NA	1	88	25	2.6	508	486	5
64	15	489	4	1	NA	3	6	1	5	4	4	NA	4	NA	3	88	45	8.4	517	495	2
734	106	490	5	NA	NA	1	2	1	1	3	1	1	5	3	1	88	20	0.7	505	484	1
734	106	491	5	NA	NA	1	3	90	9	5	2	NA	NA	NA	NA	11	25	1.3	505	484	1
852	139	492	2	NA	NA	2	19	1	1	3	2	2	6	3	3	88	25	0.8	489	511	6
322	64	493	1	4	NA	1	12	1	5	4	2	NA	3	NA	1	88	20	1.3	493	492	5
322	64	494	1	4	NA	4	3	1	3	3	3	2	1	3	2	88	20	0.5	493	492	5
322	64	495	1	4	NA	1	2	1	1	3	1	2	3	3	1	5	25	0.4	493	492	5
322	64	496	1	4	NA	1	2	1	1	3	2	2	8	3	3	4	35	4.6	493	492	5
281	41	497	5	NA	NA	1	2	1	1	3	3	1	7	3	1	4	45	12.4	508	486	7
281	41	498	5	NA	NA	2	19	1	1	3	1	2	1	3	1	88	25	0.5	508	486	7
281	41	499	5	NA	NA	4	3	1	5	4	1	NA	1	NA	1	88	25	0.6	508	486	7
281	41	500	5	NA	NA	3	6	1	1	3	1	4	6	3	1	4	30	3	508	486	7
281	41	501	5	NA	NA	12	6	1	4	4	2	NA	1	NA	2	88	15	0.1	508	486	7
281	41	502	5	NA	NA	1	2	1	5	4	1	NA	5	NA	1	88	30	0.4	508	486	7
281	41	503	5	NA	NA	7	4	1	4	4	3	NA	1	NA	2	88	25	0.6	508	486	7
281	41	504	5	NA	NA	1	2	90	9	5	1	NA	NA	NA	NA	2	20	0.4	508	486	7
281	41	505	5	NA	NA	1	2	1	5	4	4	NA	0	NA	1	88	30	2.1	508	486	7
281	41	506	5	NA	NA	1	3	1	3	1	1	1	5	2	2	1	25	1.2	508	486	7
534	77	507	2	NA	NA	2	19	1	1	3	1	1	6	2	2	88	30	0.9	489	511	3
637	109	508	4	1	2/3	2	19	1	4	4	2	NA	3	NA	2	88	20	0.3	517	495	8
637	109	509	4	1	2/3	7	4	1	3	3	1	2	4	2	2	88	20	0.8	517	495	8

Table D.1 (cont'd)

831	20	510	8	3	NA	1	7	1	5	4	1	NA	9	NA	3	4	25	1.3	498	503	1
831	20	511	8	3	NA	4	4	1	5	4	2	NA	1	NA	1	88	35	3.9	498	503	1
831	20	512	8	3	NA	4	4	1	3	3	1	3	4	3	2	3	25	1.9	498	503	1
13	2	513	3	NA	NA	4	3	1	1	3	1	1	8	2	1	88	50	9.9	498	514	1
13	2	514	3	NA	NA	4	3	1	3	3	3	1	5	3	2	88	45	4.3	498	514	1
13	2	515	3	NA	NA	4	3	1	3	3	3	2	6	3	2	88	60	5.6	498	514	1
13	2	516	3	NA	NA	4	3	1	1	3	2	2	6	3	1	88	60	13.4	498	514	1
13	2	517	3	NA	NA	1	2	90	9	5	1	NA	NA	NA	NA	11	25	1.6	498	514	1
13	2	518	3	NA	NA	1	2	1	1	3	2	3	7	3	1	88	30	2.1	498	514	1
13	2	519	3	NA	NA	7	4	1	1	3	1	3	4	3	1	4	25	1.6	498	514	1
13	2	520	3	NA	NA	7	32	90	9	5	2	NA	NA	NA	NA	11	60	18.8	498	514	1
13	2	521	3	NA	NA	1	2	1	5	4	2	NA	3	NA	3	88	25	1.6	498	514	1
13	2	522	3	NA	NA	4	3	1	1	3	1	3	3	2	1	88	45	8.8	498	514	1
138	34	523	5	NA	NA	1	5	1	7	3	1	1	4	2	4	9	15	0.1	506	486	6
138	34	524	5	NA	NA	3	6	90	9	5	1	NA	NA	NA	NA	2	20	0.5	506	486	6
138	34	525	5	NA	NA	1	2	1	3	1	1	3	7	2	2	1	25	0.8	506	486	6
138	34	526	5	NA	NA	1	2	1	1	3	2	2	5	2	3	5	20	0.5	506	486	6
138	34	527	5	NA	NA	1	2	1	5	4	1	NA	1	NA	1	88	20	0.4	506	486	6
138	34	528	5	NA	NA	2	19	1	3	3	2	1	5	2	2	88	15	0.1	506	486	6
138	34	529	5	NA	NA	1	2	90	9	5	1	NA	NA	NA	NA	11	15	0.2	506	486	6
138	34	530	5	NA	NA	2	19	1	4	4	2	NA	5	1	2	2	30	4.7	506	486	6
138	34	531	5	NA	NA	1	5	1	1	4	2	3	4	3	1	5	25	1.3	506	486	6
138	34	532	5	NA	NA	1	2	1	5	4	2	NA	5	NA	1	2	25	1.7	506	486	6
274	46	533	4	1	NA	1	7	1	1	3	3	0	2	3	1	88	30	2	517	495	6
274	46	534	4	1	NA	1	2	1	1	3	2	1	2	3	1	88	15	0.2	517	495	6
274	46	535	4	1	NA	1	3	1	1	1	1	2	7	2	1	1	25	0.8	517	495	6
274	46	536	4	1	NA	1	7	1	3	3	2	4	7	1	2	88	25	1.2	517	495	6
641	110	537	11	NA	NA	4	3	1	1	3	2	1	3	2	3	88	45	4.5	525	513	6
641	110	538	11	NA	NA	2	19	90	9	5	1	NA	NA	NA	NA	11	25	0.8	525	513	6
641	110	539	11	NA	NA	1	2	1	5	4	2	NA	3	NA	1	88	15	0.2	525	513	6
641	110	540	11	NA	NA	4	3	1	4	4	1	NA	7	NA	2	88	25	1.4	525	513	6
641	110	541	11	NA	NA	1	2	1	5	4	1	NA	2	NA	1	88	15	0.1	525	513	6
641	110	542	11	NA	NA	1	2	1	5	4	1	NA	4	NA	3	88	20	0.3	525	513	6
641	110	543	11	NA	NA	1	2	1	4	4	1	NA	5	NA	2	4	30	3.2	525	513	6

Table D.1 (cont'd)

641	110	544	11	NA	NA	1	2	1	3	3	1	1	2	4	3	2	88	20	0.4	525	513	6
641	110	545	11	NA	NA	1	2	1	3	3	1	1	3	5	2	2	88	25	0.7	525	513	6
641	110	546	11	NA	NA	1	2	1	4	4	2	2	NA	6	NA	2	88	25	1.2	525	513	6
641	110	547	11	NA	NA	1	2	1	5	4	1	1	NA	7	NA	2	88	25	0.8	525	513	6
641	110	548	11	NA	NA	1	2	1	5	4	2	2	NA	9	NA	1	88	20	1	525	513	6
641	110	549	11	NA	NA	1	2	1	1	3	2	2	0	9	3	1	4	35	5.6	525	513	6
24	10	550	5	NA	NA	1	7	1	4	4	2	2	NA	9	NA	2	4	25	1.5	506	486	2
250	8	551	6	NA	NA	1	2	1	5	4	3	3	NA	2	NA	1	88	35	6.1	503	515	1
28	12	552	5	NA	NA	1	7	1	4	4	2	2	NA	3	NA	2	88	15	0.2	508	486	2
28	12	553	5	NA	NA	1	2	90	9	5	1	1	NA	NA	NA	NA	11	15	0.2	508	486	2
28	12	554	5	NA	NA	1	7	90	9	5	1	1	NA	NA	NA	NA	11	10	0.2	508	486	2
28	12	555	5	NA	NA	2	19	1	4	4	1	1	NA	6	NA	2	88	15	0.1	508	486	2
28	12	556	5	NA	NA	1	5	1	1	3	1	1	2	6	3	3	4	25	1.5	508	486	2
190	42	557	4	1	NA	2	19	1	5	4	2	2	NA	5	NA	1	5	30	1.4	517	495	5
190	42	558	4	1	NA	6	5	1	5	4	4	4	NA	0	NA	1	88	30	6.2	517	495	5
909	144	559	1	5	NA	1	2	1	4	4	1	1	NA	7	NA	2	4	35	1.6	494	492	13
410	59	560	4	1	NA	3	2	1	5	4	2	2	NA	2	NA	1	88	20	0.4	517	495	7
410	59	561	4	1	NA	3	2	1	5	4	2	2	NA	3	NA	1	88	15	0.2	517	495	7
410	59	562	4	1	NA	1	2	90	9	5	1	1	NA	NA	NA	NA	11	30	0.6	517	495	7
410	59	563	4	1	NA	6	5	1	4	4	1	1	NA	2	NA	2	88	25	1.6	517	495	7
360	53	564	11	NA	NA	12	6	1	1	3	3	3	2	1	3	1	88	20	0.5	525	513	1
360	53	565	11	NA	NA	12	6	1	4	4	1	1	NA	1	NA	2	88	20	0.4	525	513	1
360	53	566	11	NA	NA	4	3	1	1	3	3	3	2	2	2	3	88	25	0.8	525	513	1
360	53	567	11	NA	NA	4	3	1	3	3	1	1	1	3	2	2	4	30	2.3	525	513	1
360	53	568	11	NA	NA	4	3	1	3	3	1	1	1	6	2	2	88	30	2.1	525	513	1
360	53	569	11	NA	NA	4	3	1	4	4	1	1	NA	4	NA	2	88	25	1.5	525	513	1
360	53	570	11	NA	NA	4	3	1	3	3	1	1	3	8	2	2	88	30	2.8	525	513	1
360	53	571	11	NA	NA	4	3	1	1	3	1	1	1	4	2	3	88	30	1.2	525	513	1
360	53	572	11	NA	NA	4	3	1	3	3	2	2	1	2	3	2	88	30	1.4	525	513	1
360	53	573	11	NA	NA	2	19	1	3	3	2	2	1	3	3	2	88	30	1.6	525	513	1
360	53	574	11	NA	NA	1	5	1	4	4	4	4	NA	0	NA	2	88	25	1	525	513	1
360	53	575	11	NA	NA	1	2	90	9	5	2	2	NA	NA	NA	NA	11	25	1	525	513	1
360	53	576	11	NA	NA	1	2	1	5	4	2	2	NA	3	NA	1	88	20	0.9	525	513	1
360	53	577	11	NA	NA	2	19	1	5	4	2	2	NA	6	NA	1	88	25	2.1	525	513	1

Table D.1 (cont'd)

360	53	578	11	NA	NA	2	19	1	4	4	3	NA	5	NA	2	88	25	1.4	525	513	1
360	53	579	11	NA	NA	1	2	1	5	4	3	NA	3	NA	1	88	20	0.1	525	513	1
360	53	580	11	NA	NA	1	2	1	3	3	2	1	5	3	2	4	25	0.8	525	513	1
360	53	581	11	NA	NA	1	2	90	9	5	1	NA	NA	NA	NA	11	15	0.2	525	513	1
360	53	582	11	NA	NA	1	2	1	4	4	2	NA	6	NA	2	88	20	0.7	525	513	1
360	53	583	11	NA	NA	2	1	1	4	4	2	NA	5	NA	2	88	25	0.9	525	513	1
360	53	584	11	NA	NA	2	1	1	4	4	3	NA	2	NA	2	88	20	0.7	525	513	1
360	53	585	11	NA	NA	1	2	1	1	3	1	3	7	2	1	88	15	0.3	525	513	1
360	53	586	11	NA	NA	1	10	1	4	4	3	NA	2	NA	2	88	20	0.4	525	513	1
360	53	587	11	NA	NA	1	2	1	5	4	4	NA	0	NA	1	88	15	0.2	525	513	1
360	53	588	11	NA	NA	1	2	1	1	3	2	3	6	2	1	88	20	0.9	525	513	1
360	53	589	11	NA	NA	1	2	1	5	4	1	NA	7	NA	1	4	30	3.9	525	513	1
360	53	590	11	NA	NA	1	7	1	1	3	4	1	0	2	3	88	20	0.8	525	513	1
360	53	591	11	NA	NA	1	7	1	5	4	1	NA	6	NA	3	88	15	0.2	525	513	1
360	53	592	11	NA	NA	1	2	1	5	4	2	NA	5	NA	1	88	15	0.1	525	513	1
360	53	593	11	NA	NA	1	2	1	3	3	2	1	6	3	2	5	25	0.9	525	513	1
360	53	594	11	NA	NA	1	2	1	5	4	1	NA	6	NA	1	88	25	1.1	525	513	1
360	53	595	11	NA	NA	3	7	1	4	4	1	NA	6	NA	2	88	20	0.3	525	513	1
360	53	596	11	NA	NA	2	19	1	5	4	3	NA	1	NA	1	88	35	4.9	525	513	1
360	53	597	11	NA	NA	2	19	1	4	4	2	NA	8	NA	2	88	40	4	525	513	1
360	53	598	11	NA	NA	1	2	1	4	4	2	NA	5	NA	2	88	15	0.2	525	513	1
360	53	599	11	NA	NA	2	19	1	5	4	2	NA	6	NA	1	88	20	0.5	525	513	1
360	53	600	11	NA	NA	1	2	1	5	4	1	NA	9	NA	1	4	40	5.1	525	513	1
360	53	601	11	NA	NA	2	19	1	5	4	1	NA	6	NA	1	88	20	1.1	525	513	1
360	53	602	11	NA	NA	2	19	1	5	4	1	NA	8	NA	3	88	20	0.3	525	513	1
360	53	603	11	NA	NA	1	7	1	5	4	1	NA	9	NA	4	2	25	1.2	525	513	1
360	53	604	11	NA	NA	2	2	1	1	3	2	0	5	3	1	88	45	5.7	525	513	1
759	120	605	11	NA	NA	4	3	1	3	3	1	2	7	3	2	88	30	3.6	524	514	1
759	120	606	11	NA	NA	1	2	1	5	4	1	NA	7	NA	1	88	20	0.3	524	514	1
759	120	607	11	NA	NA	1	2	90	9	5	1	NA	NA	NA	NA	11	20	1.5	524	514	1
759	120	608	11	NA	NA	1	2	1	3	3	2	1	7	3	2	88	25	1.8	524	514	1
759	120	609	11	NA	NA	1	2	1	5	4	3	NA	4	NA	1	88	20	0.7	524	514	1
759	120	610	11	NA	NA	12	7	1	1	3	1	1	5	3	3	88	20	0.7	524	514	1
759	120	611	11	NA	NA	1	2	1	4	4	1	NA	4	NA	2	88	25	0.8	524	514	1

Table D.1 (cont'd)

759	120	612	11	NA	NA	4	3	1	5	4	1	NA	6	NA	3	88	25	1.5	524	514	1
759	120	613	11	NA	NA	1	2	1	1	3	2	2	3	3	1	4	25	2.3	524	514	1
759	120	614	11	NA	NA	1	2	1	1	3	1	2	5	3	1	88	15	0.1	524	514	1
759	120	615	11	NA	NA	1	2	1	4	4	1	NA	6	NA	2	2	20	0.9	524	514	1
759	120	616	11	NA	NA	1	2	1	5	4	1	NA	4	NA	1	88	25	1	524	514	1
759	120	617	11	NA	NA	1	2	1	5	4	1	NA	4	NA	1	88	20	0.2	524	514	1
759	120	618	11	NA	NA	1	2	1	5	4	2	NA	3	NA	3	88	25	1.5	524	514	1
759	120	619	11	NA	NA	2	1	1	5	4	1	NA	6	NA	1	88	20	0.8	524	514	1
759	120	620	11	NA	NA	3	9	1	1	3	1	2	4	3	3	88	20	0.5	524	514	1
759	120	621	11	NA	NA	2	19	1	1	3	2	0	2	3	1	88	15	0.1	524	514	1
759	120	622	11	NA	NA	1	2	1	5	4	2	NA	7	NA	1	88	15	0.1	524	514	1
759	120	623	11	NA	NA	1	2	90	9	5	1	NA	NA	NA	NA	11	15	0.6	524	514	1
759	120	624	11	NA	NA	3	6	1	3	3	1	3	4	3	2	88	20	0.1	524	514	1
759	120	625	11	NA	NA	2	19	1	1	3	2	0	3	3	3	88	20	0.2	524	514	1
759	120	626	11	NA	NA	2	19	1	4	4	1	NA	6	NA	2	88	15	0.2	524	514	1
759	120	627	11	NA	NA	1	2	1	5	4	2	NA	4	NA	3	88	25	0.5	524	514	1
759	120	628	11	NA	NA	2	19	1	5	4	3	NA	2	NA	1	88	30	1.3	524	514	1
759	120	629	11	NA	NA	1	2	1	1	3	2	3	8	3	1	88	20	0.6	524	514	1
759	120	630	11	NA	NA	1	2	90	9	5	2	NA	NA	NA	NA	11	20	0.8	524	514	1
759	120	631	11	NA	NA	1	2	1	1	3	2	2	5	3	1	4	30	2.8	524	514	1
759	120	632	11	NA	NA	1	2	1	1	1	1	2	8	3	1	1	15	0.1	524	514	1
759	120	633	11	NA	NA	7	4	1	3	3	2	1	6	2	2	88	20	1	524	514	1
759	120	634	11	NA	NA	4	4	1	3	3	2	2	6	2	2	88	20	1.4	524	514	1
759	120	635	11	NA	NA	6	7	90	9	5	1	NA	NA	NA	NA	11	20	1.3	524	514	1
759	120	636	11	NA	NA	6	7	1	5	4	1	NA	5	NA	1	88	20	0.9	524	514	1
759	120	637	11	NA	NA	7	4	1	5	4	1	NA	5	NA	1	88	20	0.4	524	514	1
759	120	638	11	NA	NA	4	4	1	5	4	2	NA	9	NA	1	4	30	3.5	524	514	1
759	120	639	11	NA	NA	4	4	1	5	4	3	NA	6	NA	1	88	40	8.4	524	514	1
759	120	640	11	NA	NA	7	4	1	5	4	1	NA	4	NA	1	4	30	2.8	524	514	1
759	120	641	11	NA	NA	4	4	1	3	3	2	7	5	3	2	88	30	2.9	524	514	1
75	1	642	1	NA	NA	2	19	1	5	4	2	NA	6	NA	1	88	25	1.3	492	489	1
75	1	643	1	NA	NA	1	2	1	5	4	2	NA	3	NA	3	88	10	0.1	492	489	1
75	1	644	1	NA	NA	1	7	90	9	5	1	NA	NA	NA	NA	11	20	0.6	492	489	1
75	1	645	1	NA	NA	1	7	1	3	3	2	1	4	3	2	88	20	0.4	492	489	1

Table D.1 (cont'd)

75	1	646	1	NA	NA	4	4	4	1	1	3	3	3	3	4	0	0	2	2	2	88	40	2.9	492	489	1
75	1	647	1	NA	NA	4	4	4	1	1	3	3	3	3	1	2	1	3	2	2	88	50	13.3	492	489	1
75	1	648	1	NA	NA	4	4	4	1	1	1	3	1	3	1	1	2	2	2	2	88	60	22.6	492	489	1
75	1	649	1	NA	NA	3	6	1	1	1	5	4	4	3	3	NA	1	NA	1	1	88	25	1.9	492	489	1
75	1	650	1	NA	NA	1	2	1	1	1	5	4	4	1	NA	2	NA	3	3	88	20	0.4	492	489	1	
75	1	651	1	NA	NA	1	2	1	1	1	3	3	3	3	3	3	5	2	2	2	88	25	0.8	492	489	1
75	1	652	1	NA	NA	4	4	4	1	1	5	4	4	1	NA	2	NA	1	1	88	20	0.3	492	489	1	
75	1	653	1	NA	NA	1	2	1	1	1	5	4	4	3	NA	3	NA	1	1	88	25	1.3	492	489	1	
75	1	654	1	NA	NA	1	2	90	90	9	9	5	5	1	NA	NA	NA	NA	NA	11	15	1	492	489	1	
75	1	655	1	NA	NA	2	19	90	90	9	9	5	5	1	NA	NA	NA	NA	NA	11	25	2.8	492	489	1	
75	1	656	1	NA	NA	4	4	4	1	1	3	3	3	3	4	0	0	2	2	2	88	15	0.2	492	489	1
75	1	657	1	NA	NA	4	4	4	1	1	3	3	3	3	1	0	3	2	2	2	88	25	1.5	492	489	1
75	1	658	1	NA	NA	1	2	1	1	1	3	3	3	3	2	2	6	3	2	2	88	25	1.5	492	489	1
75	1	659	1	NA	NA	12	7	1	1	1	4	4	4	4	1	NA	4	NA	2	1	1	20	0.4	492	489	1
75	1	660	1	NA	NA	1	2	1	1	1	5	4	4	4	2	NA	6	NA	1	1	88	30	2.5	492	489	1
75	1	661	1	NA	NA	1	2	1	1	1	4	4	4	4	1	NA	9	NA	2	2	4	30	1.4	492	489	1
75	1	662	1	NA	NA	1	2	1	1	1	5	4	4	4	2	NA	9	NA	3	3	88	20	1.2	492	489	1
75	1	663	1	NA	NA	1	2	1	1	1	5	4	4	4	3	NA	1	NA	3	3	88	20	0.6	492	489	1
75	1	664	1	NA	NA	2	19	1	1	1	3	3	3	3	2	0	6	3	2	2	4	30	2.5	492	489	1
75	1	665	1	NA	NA	1	2	1	1	1	4	4	4	4	3	NA	6	NA	2	2	88	30	1.7	492	489	1
75	1	666	1	NA	NA	1	2	1	1	1	5	4	4	4	3	NA	9	NA	3	3	88	30	5.3	492	489	1
75	1	667	1	NA	NA	4	3	1	1	1	3	3	3	3	3	1	2	2	2	2	88	30	2.5	492	489	1
75	1	668	1	NA	NA	4	3	1	1	1	3	3	3	3	1	2	1	2	2	2	88	30	1.5	492	489	1
75	1	669	1	NA	NA	4	3	1	1	1	3	3	3	3	2	2	3	3	2	2	88	30	3.1	492	489	1
75	1	670	1	NA	NA	4	3	1	1	1	5	4	4	4	1	NA	3	NA	1	1	5	25	1.1	492	489	1
75	1	671	1	NA	NA	4	3	1	1	1	5	4	4	4	3	NA	1	NA	1	1	88	30	1.2	492	489	1
75	1	672	1	NA	NA	4	3	1	1	1	1	3	1	3	1	1	7	3	1	1	88	25	0.9	492	489	1
75	1	673	1	NA	NA	4	3	1	1	1	5	4	4	4	4	NA	0	NA	3	3	88	60	16.2	492	489	1
75	1	674	1	NA	NA	1	2	90	90	9	9	5	5	1	NA	NA	NA	NA	NA	11	15	0.1	492	489	1	
75	1	675	1	NA	NA	4	3	1	1	1	4	4	4	4	2	NA	2	NA	2	2	88	25	1.2	492	489	1
75	1	676	1	NA	NA	4	3	1	1	1	1	3	3	3	3	2	3	3	1	1	88	30	3	492	489	1
75	1	677	1	NA	NA	4	3	1	1	1	3	3	3	3	2	0	7	3	2	2	88	55	12.2	492	489	1
75	1	678	1	NA	NA	4	3	1	1	1	4	4	4	4	1	NA	1	NA	2	2	88	35	2.8	492	489	1
75	1	679	1	NA	NA	9	3	1	1	1	5	4	4	4	1	NA	1	NA	3	3	88	35	3.2	492	489	1

Table D.1 (cont'd)

75	1	680	1	NA	NA	4	3	1	5	4	2	NA	6	NA	3	88	60	10.1	492	489	1
75	1	681	1	NA	NA	2	1	1	5	2	1	NA	8	NA	3	2	25	1.4	492	489	1
75	1	682	1	NA	NA	7	32	1	5	4	2	NA	5	NA	1	88	20	0.8	492	489	1
75	1	683	1	NA	NA	4	3	1	5	4	1	NA	4	NA	1	88	45	5.1	492	489	1
246	55	684	1	4	NA	2	19	1	3	3	2	8	7	3	2	5	35	5.2	494	492	4
482	88	685	11	NA	NA	1	3	1	1	3	1	3	7	3	1	88	25	0.8	525	513	3
8	14	686	4	NA	NA	8	30	1	5	4	1	NA	7	NA	3	88	20	0.1	517	492	1
360	53	687	11	NA	NA	4	3	1	3	3	2	1	7	3	2	5	65	46.9	525	513	1
360	53	688	11	NA	NA	3	7	1	4	4	1	NA	9	NA	2	88	25	2.7	525	513	1
360	53	689	11	NA	NA	1	2	1	4	4	1	NA	9	NA	2	88	20	0.7	525	513	1
360	53	690	11	NA	NA	1	5	1	3	3	2	2	3	3	2	88	25	1.3	525	513	1
759	120	691	11	NA	NA	2	19	1	3	3	2	1	5	3	2	88	30	1.5	524	514	1
759	120	692	11	NA	NA	2	19	1	4	4	3	NA	4	NA	2	88	25	2.1	524	514	1
759	120	693	11	NA	NA	1	2	1	4	4	1	NA	5	NA	2	88	20	1.1	524	514	1
759	120	694	11	NA	NA	1	2	1	3	3	1	1	6	3	2	88	25	0.7	524	514	1
759	120	695	11	NA	NA	1	2	1	4	4	1	NA	4	NA	2	88	20	1	524	514	1
759	120	696	11	NA	NA	4	4	1	1	3	0	6	9	2	1	4	65	39.2	524	514	1
190	42	697	4	1	NA	6	7	1	1	4	3	2	5	3	3	4	55	47	517	495	5
28	12	698	5	NA	NA	3	6	1	4	4	2	NA	7	NA	2	5	45	6.3	506	486	2
836	112	699	1	5	NA	7	4	1	1	3	1	3	5	2	3	4	55	16	494	492	12
418	58	700	4	1	NA	1	2	1	5	4	2	NA	2	NA	1	88	25	0.9	518	494	7
138	34	701	5	NA	NA	1	2	1	5	4	3	NA	6	NA	3	88	30	4.3	506	486	6
13	2	702	3	NA	NA	3	6	1	5	4	1	NA	4	NA	1	88	30	0.8	498	514	2
792	126	703	4	NA	NA	1	7	1	4	4	1	NA	9	NA	1	2	25	1.9	519	496	3
11	14	704	4	NA	NA	1	2	1	4	4	2	NA	9	NA	2	4	40	9.5	517	492	1
11	14	705	4	NA	NA	1	5	1	5	4	3	NA	7	NA	1	4	35	3	517	492	1
47	24	706	5	NA	NA	12	6	1	4	4	1	NA	3	NA	2	4	35	6	506	486	3
661	105	707	11	NA	NA	2	19	1	1	3	2	3	6	3	1	4	35	3.7	524	513	2
281	41	708	5	NA	NA	1	16	1	3	3	1	1	9	3	2	88	30	2.2	508	486	7
571	80	709	11	NA	NA	1	2	1	3	3	2	1	8	3	2	4	35	3.2	524	513	1
571	80	710	11	NA	NA	2	19	1	5	4	1	NA	6	NA	1	88	25	0.7	524	513	1
571	80	711	11	NA	NA	1	2	1	5	4	1	NA	7	NA	1	88	15	0.2	524	513	1
211	45	712	10	NA	NA	1	2	1	5	4	2	NA	9	NA	1	4	35	4.5	510	522	2
696	113	713	5	NA	NA	7	18	1	5	4	1	4	6	3	1	4	40	8.1	505	483	1

Table D.1 (cont'd)																					
208	32	714	4	1	NA	7	18	1	5	4	2	NA	5	NA	1	4	50	22.2	517	495	4
918	143	715	2	NA	NA	2	19	1	1	3	1	1	9	3	1	88	35	2.3	489	511	7
147	35	716	5	NA	NA	1	2	1	4	4	2	NA	2	NA	2	5	30	4.6	508	486	6

APPENDIX E

Table E.1: Frank's Ruin Stone Tools (Variables 1 – 19)

Bag#	Lot#	Art.#	Prov.	St.#	Ft.	R.M.	Col.	AT	Con.	FTO	Cor.	PS	DS	In.	Ter.	FTN	Len.	Wid.
696	113	1	5	NA	NA	1	2	3.4	1	3	3	3	9	3	3	4	4.2	3.2
696	113	2	5	NA	NA	1	7	2.6.1	5	2	1		9		3	2	1.8	1.6
696	113	3	5	NA	NA	1	12	10.3	1	NA	3	NA	NA	NA	NA	NA	2.7	2.1
134	33	4	4	1	NA	6	5	10.2	1	NA	1	NA	NA	NA	NA	NA	4.3	3.6
705	107	5	1	4	NA	1	7	10.3	1	NA	1	NA	NA	NA	NA	NA	3.2	2.1
208	32	6	4	1	NA	1	2	10.3	1	NA	2	NA	NA	NA	NA	NA	2.8	2.5
918	143	7	2	NA	NA	1	2	3.6.1	1	3	2	0	9	2	3	5	3.5	2.9
918	143	8	2	NA	NA	1	17	6	6	3	1	4	3	2	1	6	1.6	1.2
918	143	9	2	NA	NA	1	2	18	4	4	2	NA	5	NA	2	88	2.3	1.6
546	99	10	1	5	NA	1	11	7.4	6	NA	1	NA	NA	NA	NA	NA	1	0.7
728	117	11	4	NA	NA	1	2	10.1	1	NA	4	NA	NA	NA	NA	NA	6.3	5.3
17	3	12	5	NA	NA	1	5	3.1	1	3	2	3	9	3	1	5	3.7	2.6
17	3	13	5	NA	NA	1	3	10.3	1	NA	1	NA	NA	NA	NA	NA	3.3	2.6
940	130	14	4	NA	NA	1	7	7.3	5	NA	1	NA	NA	NA	NA	NA	2.1	1.5
940	130	15	4	NA	NA	1	2	10.1	1	NA	3	NA	NA	NA	NA	NA	4	3.4
594	103	16	1	4	NA	1	2	10.1	1	NA	3	NA	NA	NA	NA	NA	3.4	2.7
563	97	17	11	NA	NA	1	3	3.4.1	5	4	1	NA	9	NA	1	4	3.1	2.2
529	92	18	1	4	NA	1	2	10.1	1	NA	4	NA	NA	NA	NA	NA	4.1	3.8
446	83	19	1	4	NA	2	1	2.9.1	4	4	1	NA	9	NA	2	5	2.5	1.7
618	102	20	11	NA	NA	4	3	3.1	1	3	1	1	9	3	1	5	4.7	3
618	102	21	11	NA	NA	1	2	10.1	1	NA	2	NA	NA	NA	NA	NA	4.6	2.5
480	88	22	11	NA	NA	3	7	7.3	6	NA	1	NA	NA	NA	NA	NA	1.6	1.3
480	88	23	11	NA	NA	1	5	3.2	4	4	2	NA	9	NA	2	88	2.2	1.4
927	61	24	7	NA	NA	1	2	10.1	1	NA	1	NA	NA	NA	NA	NA	3	1.6
714	108	27	1	5	NA	1	2	2.7	1	3	2	0	9	2	1	4	4.7	4.1
714	108	28	1	5	NA	1	2	5	2	NA	1	NA	NA	NA	NA	88	3.6	2.6
714	108	29	1	5	NA	1	2	10.1	1	NA	4	NA	NA	NA	NA	NA	4.2	3.7
714	108	30	1	5	NA	1	2	10.3	1	NA	3	NA	NA	NA	NA	NA	2.9	1.9
211	45	31	10	NA	NA	12	9	3.6.1	4	88	1	NA	9	NA	2	88	2.5	1.7
303	40	33	5	NA	NA	1	2	3.4	5	4	2	NA	9	NA	1	4	3.5	1.6

Table E.1 (cont'd)

303	40	34	5	NA	NA	1	2	16	7	NA	4	NA	NA	NA	NA	NA	NA	3.1	2.8
303	40	35	5	NA	NA	1	20	7.3	6	NA	1	NA	NA	NA	NA	NA	NA	2.3	1.6
134	33	36	4	1	NA	1	2	10.1	1	NA	2	NA	NA	NA	NA	NA	NA	3.2	2.7
792	126	37	4	NA	NA	1	2	2.4.1	1	3	2	3	9	3	1	4	2.7	2	
792	126	38	4	NA	NA	2	19	3.4	5	4	3	NA	9	NA	1	4	3.9	2.9	
116	30	39	5	NA	NA	1	2	3.4.1	1	3	2	1	9	2	1	4	2.7	2.4	
116	30	40	5	NA	NA	1	2	10.2	1	NA	2	NA	NA	NA	NA	NA	3.6	2.8	
65	18	41	4	1	NA	1	7	3.1	3	3	3	0	9	3	2	4	4.2	2.7	
661	105	42	11	NA	NA	1	2	3.1	5	4	3	NA	7	NA	1	88	2.7	1.6	
378	74	43	1	5	NA	4	3	10.2	1	NA	2	NA	NA	NA	NA	NA	6.8	5.7	
859	111	44	1	4	NA	1	18	10.3	1	NA	2	NA	NA	NA	NA	NA	2.3	2.2	
770	121	45	11	NA	NA	1	7	7.3	6	NA	1	NA	NA	NA	NA	NA	2.1	0.8	
770	121	46	11	NA	NA	1	2	10.1	1	NA	2	NA	NA	NA	NA	NA	2.4	2.4	
281	41	47	5	NA	NA	1	18	7.2	1	NA	3	NA	NA	NA	NA	NA	4.3	3.1	
11	14	48	4	NA	NA	7	4	6	1	NA	3	NA	NA	NA	NA	NA	5.3	2.8	
11	14	49	4	NA	NA	1	2	3.1	5	4	3	NA	7	NA	1	5	3.6	2.4	
11	14	50	4	NA	NA	1	2	3.7.1	3	3	1	2	9	2	2	1	2.2	1.4	
11	14	51	4	NA	NA	7	4	3.4.1	3	3	1	2	9	2	2	4	3.2	2.9	
11	14	52	4	NA	NA	1	2	10.1	1	NA	2	NA	NA	NA	NA	NA	4	3.9	
11	14	53	4	NA	NA	1	2	10.3	1	NA	1	NA	NA	NA	NA	NA	1.8	1.4	
571	80	54	11	NA	NA	1	2	3.4	1	3	2	1	9	3	1	4	3.6	3.6	
571	80	55	11	NA	NA	2	19	2.4.1	1	3	5	4	1	2	1	88	3.5	2.6	
571	80	56	11	NA	NA	1	2	2.2	4	4	2	NA	4	NA	2	88	2.7	1.8	
571	80	57	11	NA	NA	2	19	10.3	1	NA	2	NA	NA	NA	NA	NA	2	1.6	
895	137	58	11	NA	NA	1	2	2.4.1	5	4	3	NA	9	NA	1	4	3.7	2.8	
895	137	59	11	NA	NA	1	2	20	1	NA	4	NA	NA	NA	NA	NA	3.3	1.8	
895	137	60	11	NA	NA	1	2	16	3	3	3	0	2	2	2	4	4.3	3.4	
724	124	61	12	NA	NA	1	3	2.7.1	5	4	1	NA	8	NA	1	4	2.3	1.7	
418	58	62	4	1	NA	1	2	2.1	5	4	2	NA	3	NA	1	88	2	1.5	
759	120	63	11	NA	NA	1	2	3.1	1	3	3	1	9	2	1	88	3.2	2.7	
759	120	64	11	NA	NA	1	2	2.7.1	1	3	3	0	9	3	1	5	2.6	1.9	
759	120	65	11	NA	NA	1	2	3.1	5	4	3	NA	9	NA	1	4	3.7	2.4	
759	120	66	11	NA	NA	2	19	3.4	1	3	3	3	9	2	1	4	3.3	1.9	
759	120	67	11	NA	NA	2	7	10.3	1	NA	2	NA	NA	NA	NA	NA	2.1	1.9	

Table E.1 (cont'd)

836	112	68	1	5	NA	1	1	5	10.3	1	NA	2	NA	NA	NA	NA	2.9	2.2
641	110	69	11	NA	NA	1	1	3	10.1	1	NA	2	NA	NA	NA	NA	5.6	4.9
13	2	70	3	NA	NA	1	1	7	10.3	1	NA	2	NA	NA	NA	NA	3.4	1.8
13	2	71	3	NA	NA	2	2	7	6	1	NA	1	NA	NA	NA	NA	2	1.7
75	1	72	1	NA	NA	1	1	5	2.4	1	3	1	2	9	3	4	4.3	2.5
75	1	73	1	NA	NA	7	7	4	20	3	3	1	3	8	3	2	4	2.9
75	1	74	1	NA	NA	1	1	2	3.1	5	4	2	NA	9	NA	1	88	2.1
75	1	75	1	NA	NA	1	1	2	2.6.1	1	3	1	1	3	3	3	88	1.5
75	1	76	1	NA	NA	2	2	19	2.1	5	4	1	NA	5	NA	1	88	1.4
75	1	77	1	NA	NA	1	1	2	2.1	3	3	2	1	9	3	2	4	3.5
75	1	78	1	NA	NA	1	1	4	2.4	3	3	3	1	7	3	2	88	2.3
75	1	79	1	NA	NA	1	1	2	3.8.1	5	4	1	NA	6	NA	1	88	1.7
75	1	80	1	NA	NA	2	2	19	10.3	1	NA	4	NA	NA	NA	NA	2.6	1.7
75	1	81	1	NA	NA	1	1	2	10.1	1	NA	3	NA	NA	NA	NA	3.7	3.4
69	26	82	5	NA	NA	1	1	5	3.1	4	4	2	NA	8	NA	2	88	2.4
656	96	83	4	NA	NA	3	3	6	10.1	1	88	1	NA	NA	NA	NA	4.1	3.9
656	96	84	4	NA	NA	1	1	2	10.1	1	NA	3	NA	NA	NA	NA	5.1	2.7
360	53	85	11	NA	NA	1	1	2	13	1	3	3	2	9	3	1	4	3.2
360	53	86	11	NA	NA	1	1	5	20	5	4	3	NA	7	NA	1	88	2.2
360	53	87	11	NA	NA	1	1	2	3.4	3	3	1	2	6	3	2	5	1.9
360	53	88	11	NA	NA	1	1	19	10.3	1	NA	1	NA	NA	NA	NA	3.6	2
360	53	89	11	NA	NA	6	6	7	2.2	4	4	1	NA	9	NA	2	4	5.4
123	31	90	5	NA	NA	1	1	2	3.1	1	3	3	0	9	3	1	4	3.8
123	31	91	5	NA	NA	1	1	2	3.9.1	5	4	4	NA	6	NA	1	88	2.3
123	31	92	5	NA	NA	1	1	7	13	5	4	4	NA	6	NA	1	88	2.3
123	31	93	5	NA	NA	1	1	3	10.3	1	NA	3	NA	NA	NA	NA	NA	3.4
831	20	94	8	3	NA	1	1	2	2.1	1	3	1	1	9	3	3	4	3.8
831	20	95	8	3	NA	1	1	2	10.1	1	NA	2	NA	NA	NA	NA	NA	2.6
831	20	96	8	3	NA	7	7	4	2.7.1	5	4	1	NA	6	NA	1	4	3.1
831	20	97	8	3	NA	4	4	3	10.3	1	NA	1	NA	NA	NA	NA	NA	2.9
831	42	99	4	1	NA	2	2	19	3.8.1	5	4	1	NA	9	NA	3	4	4
831	42	100	4	1	NA	1	1	20	10.3	1	NA	2	NA	NA	NA	NA	NA	2.1
410	59	101	4	1	NA	1	1	2	13	1	3	1	3	9	3	1	4	2.8
410	59	102	4	1	NA	1	1	2	13	1	4	3	7	9	2	1	4	3.6

Table E.1 (cont'd)

28	12	103	5	NA	NA	1	2	2.7.1	1	3	2	1	4	3	1	3	3.1	1.5
28	12	104	5	NA	NA	1	2	3.4.1	3	3	2	3	9	3	2	88	3.6	1.6
138	34	105	5	NA	NA	1	3	2.2	4	4	1	NA	4	NA	2	5	1.9	1
446	83	106	1	3	NA	1	2	6	1	3	2	1	7	2	1	5	2.1	1.5
24	10	107	5	NA	NA	1	7	3.8.1	4	4	3	NA	9	NA	2	88	2.2	1.5
405	59	108	4	1	1,3	1	3	3.6	1	3	1	3	9	3	1	4	9	5.2
811	138	109	3	2	NA	1	3	2.1	4	4	1	NA	3	NA	2	88	1.7	1.3
340	67	110	5	5	NA	1	7	10.3	1	NA	3	NA	NA	NA	NA	NA	2	2
511	92	111	1	4	NA	4	3	10.1	1	NA	2	NA	NA	NA	NA	NA	9	8.2
511	92	112	1	4	NA	4	3	10.2	1	NA	2	NA	NA	NA	NA	NA	9	8
75	1	113	1	NA	NA	4	3	10.1	1	NA	2	NA	NA	NA	NA	NA	8	6.4
75	1	114	1	NA	NA	4	3	10.1	1	NA	2	NA	NA	NA	NA	NA	7.7	6
75	1	115	1	NA	NA	4	3	10.1	1	NA	1	NA	NA	NA	NA	NA	9.3	5.8
82	1	116	1	NA	NA	8	30	13	5	4	1	NA	9	NA	4	4	3.3	1.6
18	3	117	5	NA	NA	8	30	3.1	5	4	1	NA	5	NA	3	88	2	1.9
761	120	118	11	NA	NA	1	15	7.4	3	NA	1	NA	NA	NA	NA	NA	1.9	1.5
147	35	119	5	NA	NA	1	2	10.3	1	NA	2	NA	NA	NA	NA	NA	2.2	1.6
47	24	120	5	NA	NA	12	18	10.1	4	NA	1	NA	NA	NA	NA	NA	3	2.3
438	84	121	1	1	NA	1	2	10.1	1	NA	1	NA	NA	NA	NA	NA	4.2	2.6

Table E.2: Frank's Ruin Stone Tools (Variables 20 – 38)

Art.#	Thk.	W.	LER	LTR	LIR	LT	LG	LEA	LS	RER	RTR	RIR	RT	RG	REA	RS	DER	DTR	DIR
1	0.75	7.3	0.6	1,3	0.1	1.1	1.3	65	2	0.1	1	0.1	1.2	2	42	2	NA	NA	NA
2	0.55	1.7	0.5	1,3	0.1	1.1	2	43	1	NA	NA	NA	2	2	NA	1	1	1,2,3	0.1
3	1.2	7.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4	2.5	55.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5	1.2	7.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
6	1.1	6.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7	0.7	8.2	NA	NA	NA	2	2	NA	1	0.8	1,2	0.1	1.1	2	43	3	1	1,2	0.3
8	0.6	0.6	NA	NA	NA	2	2	NA	4	NA	NA	NA	2	2	NA	4	1	2,1,3	0.6
9	0.6	2.3	0.3	1	0.2	2	2	75	4	0.4	1	0.3	2	2	80	1	NA	NA	NA
10	0.2	0.2	1	1,2	1	2	2	50	1	1	11	2	2	50	1	NA	NA	NA	NA
11	2.4	59.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
12	1.1	7.8	NA	NA	NA	1.4	2	NA	4	0.8	1	0.2	1.2	2	58	3	NA	NA	NA
13	1.1	9.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
14	0.7	2.4	1	1,2	1	2	2	47	1	1	1,2	1	2	2	70	1	NA	NA	NA
15	1.7	22.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
16	2.2	21.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
17	1.1	8.3	1	1,3	0.7	1.1	2	85	1	NA	NA	NA	1.8	2	NA	1	0.4	1	0.4
18	2.7	38.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
19	0.4	1.9	0.6	1	0.1	1.3	2	66	1	1	1,2	0.2	1.3	2	55	1	1	1	0.1
20	1.3	17.9	NA	NA	NA	2	2	NA	1	NA	NA	NA	2	2	NA	4	1	1,3	0.1
21	1.5	17.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
22	0.5	0.8	1	1	1	2	2	50	1	1	1,3	1	2	2	65	1	NA	NA	NA
23	0.7	2.7	0.9	2,1,3	0.5	1.1	2	70	1	NA	NA	NA	2	2	NA	1	NA	NA	NA
24	1.4	5.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
27	1.3	18.1	0.2	1	0.1	2	2	45	3	0.1	1	0.1	2	2	75	2	0.3	1	0.1
28	0.8	8.5	1	1,2	0.3	2	2	90	1	1	1,3	0.3	2	2	80	1	NA	NA	NA
29	2.7	34.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
30	1.2	5.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
31	0.5	2.1	1	1	0.8	1.1	2	55	3	0.5	1	0.3	2	2	65	3	NA	NA	NA
33	0.7	3.2	0.2	1	0.1	2	2	50	4	1	1,2	0.6	1.1	1.9	55	4	NA	NA	NA
34	1.4	10.7	NA	NA	NA	2	2	NA	4	NA	NA	NA	2	2	NA	4	1	2,1	1
35	0.7	1.8	1	2,1	1	2	2	75	1	1	1,2	1	2	2	75	1	NA	NA	NA

[illegible]

Table E.2 (cont'd)

[illegible]

Table E.2 (cont'd)

105	0.6	0.9	1	1	0.2	2	2	65	1	NA	NA	NA	2	2	NA	1	NA	NA	NA
106	0.5	1.4	NA	NA	NA	1.4	2	NA	1	0.5	1	0.2	1.1	2	60	1	1	NA	NA
107	0.5	1.4	0.2	2	0.2	1.3	2	65	1	1	2.1	0.3	2	2	75	1	0.7	1	0.3
108	1.5	78.5	1	1	0.1	2	2	85	1	NA	NA	NA	2	2	NA	1	1	1.3	0.2
109	0.3	0.9	1	1	0.2	1.1	2	60	1	NA	NA	NA	2	2	NA	3	NA	NA	NA
110	1	4.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
111	4.8	363.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
112	4.2	292.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
113	4.3	262.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
114	4.2	225.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
115	2.6	168.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
116	1.3	3.9	0.2	1.3	0.2	1.2	2	85	4	NA	NA	NA	1.2	2	NA	4	NA	NA	NA
117	0.5	0.8	0.9	1.3	0.2	2	2	75	2	NA	NA	NA	1.2	2	NA	3	NA	NA	NA
118	0.4	1.3	1	1	1	1	1	45	1	1	1.3	1	1.3	2	55	4	NA	NA	NA
119	1.1	4.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
120	0.8	5.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
121	1.6	15.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table E.3: Frank's Ruin Stone Tools (Variables 39-56)

Art.#	DT	Noth.	DG	DEA	DS	PER	PTR	PIR	PT	PG	PEA	PS	OS	TS	Lo.S	E	N	L
1	2	NA	2	NA	1	NA	NA	NA	NA	0.8	NA	3	8	12	12	505	483	1
2	2	NA	2	68	3	NA	NA	NA	2	2	NA	1	8	12	1	505	483	1
3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	505	483	1
4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	518	494	4
5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	493	492	11
6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	517	495	4
7	2	NA	2	60	3	NA	NA	NA	2	2	NA	1	8	12	8	489	511	7
8	2	NA	2	75	3	NA	NA	NA	2	2	NA	NA	8	12	9	489	511	7
9	2	NA	2	NA	4	NA	NA	NA	2	2	NA	4	5	12	9	489	511	7
10	NA	NA	NA	NA	NA	NA	NA	NA	2	2	NA	1	5	11	9	494	492	9
11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	519	496	2
12	2	NA	2	NA	3	NA	NA	NA	2	2	NA	1	8	3	9	506	486	1
13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	506	486	1
14	NA	NA	NA	NA	NA	NA	NA	NA	2	2	NA	1	2	8	5	516	496	1
15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	516	496	1
16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	493	492	10
17	1.1	NA	2	75	2	NA	NA	NA	2	2	NA	NA	NA	NA	NA	525	513	4
18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	493	492	8
19	2	NA	2	60	2	NA	NA	NA	2	2	NA	2	8	2	9	493	492	7
20	2	NA	2	70	4	NA	NA	NA	2	2	NA	1	8	12	9	525	513	5
21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	525	513	5
22	2	NA	2	NA	NA	NA	NA	NA	2	2	NA	NA	5	8	7	525	513	3
23	2	NA	2	NA	1	NA	NA	NA	2	2	NA	1	8	12	9	525	513	3
24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	484	495	1
27	2	NA	2	45	3	NA	NA	NA	2	2	NA	1	8	8	9	494	492	11
28	2	NA	2	NA	1	0.9	1.2	0.2	1.1	2	65	1	8	12	9	494	492	11
29	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	494	492	11
30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	494	492	11
31	2	NA	2	NA	4	NA	NA	NA	2	2	NA	1	5	12	4	510	522	2
33	2	NA	2	NA	4	NA	NA	NA	1.3	2	NA	4	8	12	4	506	486	7
34	2	NA	2	85	3	NA	NA	NA	2	2	NA	NA	8	12	9	506	486	7
35	2	NA	2	NA	4	NA	NA	NA	2	2	NA	2	8	12	9	506	486	7
36	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	518	494	4

Table E.3 (cont'd)

37	1.1	NA	2	NA	3	NA	NA	NA	NA	1.1	2	NA	3	8	9	519	496	3	
38	2	NA	2	NA	3	0.2	1	0.2	NA	2	2	60	3	8	9	519	496	3	
39	2	NA	2	8	1	NA	NA	NA	NA	2	2	NA	4	8	9	506	486	5	
40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	9	506	486	5	
41	2	NA	2	NA	1	NA	NA	NA	NA	2	2	NA	NA	8	9	518	494	2	
42	2	NA	2	NA	4	NA	NA	NA	NA	2	2	NA	4	8	9	524	513	2	
43	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	9	494	492	6	
44	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	9	493	492	12	
45	NA	NA	NA	NA	NA	NA	NA	NA	NA	2	2	NA	NA	8	9	524	513	3	
46	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	9	524	513	3	
47	1.1	NA	2	65	1	1	1	0.5	NA	1.2	2	65	1	8	9	508	486	7	
48	1.1	NA	2	80	3	NA	NA	NA	NA	1.1	2	NA	4	2	9	517	492	1	
49	2	NA	2	NA	3	NA	NA	NA	NA	2	2	NA	1	8	9	517	492	1	
50	2	NA	2	95	3	0.2	1	0.1	NA	1.8	2	105	2	8	12	4	517	492	1
51	2	NA	2	NA	1	NA	NA	NA	NA	2	2	NA	1	8	9	517	492	1	
52	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	9	517	492	1	
53	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	9	517	492	1	
54	1.1	NA	2	80	4	NA	NA	NA	NA	2	2	NA	1	8	9	524	513	1	
55	2	NA	2	65	3	NA	NA	NA	NA	2	2	NA	4	8	12	4	524	513	1
56	2	NA	2	NA	2	NA	NA	NA	NA	2	2	NA	1	8	12	9	524	513	1
57	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	9	524	513	1	
58	1.1	NA	2	80	3	NA	NA	NA	NA	2	2	NA	1	5	12	4	524	514	3
59	2	NA	2	NA	1	0.8	1	0.7	NA	2	2	85	2	8	12	9	524	514	3
60	2	NA	2	NA	3	NA	NA	NA	NA	2	2	NA	3	8	12	9	524	514	3
61	2	NA	2	65	1	NA	NA	NA	NA	1.4	2	NA	1	8	12	9	476	495	0
62	2	NA	2	70	1	NA	NA	NA	NA	2	2	NA	1	8	12	9	518	494	7
63	1.3	NA	2	70	4	NA	NA	NA	NA	2	2	NA	1	8	12	9	524	514	1
64	1.2	NA	2	75	1	NA	NA	NA	NA	2	2	NA	1	8	12	9	524	514	1
65	2	NA	2	NA	1	NA	NA	NA	NA	2	2	NA	1	8	12	9	524	514	1
66	2	NA	2	NA	4	NA	NA	NA	NA	2	2	NA	4	8	12	9	524	514	1
67	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	9	524	514	1	
68	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	494	492	12
69	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	525	513	6
70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	498	514	2

Table E.3 (cont'd)

71	2	NA	2	NA	1	NA	NA	NA	2	2	NA	4	9	12	10	498	514	2
72	2	NA	2	NA	1	NA	NA	NA	2	2	NA	1	8	12	9	492	489	1
73	2	NA	2	NA	4	NA	NA	NA	2	2	4	4	8	12	9	492	489	1
74	2	NA	2	NA	1	NA	NA	NA	2	2	NA	1	8	12	9	492	489	1
75	2	NA	2	NA	1	NA	NA	NA	2	2	NA	1	8	12	9	492	489	1
76	2	NA	2	NA	1	NA	NA	NA	2	2	NA	1	8	12	9	492	489	1
77	1.1	NA	2	NA	1	NA	NA	NA	2	2	NA	1	8	12	9	492	489	1
78	1.1	NA	2	NA	2	NA	NA	NA	2	2	NA	4	8	12	9	492	489	1
79	1.3	NA	2	NA	2	NA	NA	NA	2	2	NA	1	8	12	9	492	489	1
80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	492	489	1
81	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	492	489	1
82	2	NA	2	NA	1	NA	NA	NA	2	2	NA	1	8	12	9	506	486	4
83	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	519	496	1
84	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	519	496	1
85	1.2	NA	2	NA	1	NA	NA	NA	2	2	NA	1	8	5	9	525	513	1
86	2	NA	2	NA	4	NA	NA	NA	2	2	NA	1	8	3	3	525	513	1
87	2	NA	2	NA	1	NA	NA	NA	2	2	NA	1	8	12	9	525	513	1
88	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	525	513	1
89	2	NA	2	NA	4	NA	NA	NA	2	2	NA	4	8	12	9	525	513	1
90	1.1	NA	2	NA	1	NA	NA	NA	2	2	NA	1	8	12	9	508	486	5
91	2	NA	2	NA	1	NA	NA	NA	1.1	2	60	4	8	12	9	508	486	5
92	1.1	NA	2	NA	1	NA	NA	NA	2	2	NA	1	5	3	7	508	486	5
93	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	508	486	5
94	2	NA	2	NA	1	NA	NA	NA	2	2	NA	1	8	12	9	498	503	1
95	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	498	503	1
96	1.3	NA	2	NA	2	NA	NA	NA	2	2	NA	2	9	3	4	498	503	1
97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	498	503	1
99	1.2	NA	2	NA	1	0.7	3,1	0.2	1.2	2	65	1	4	4	1	517	495	5
100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	517	495	5
101	1.1	NA	2	NA	2	NA	NA	NA	1.3	2	NA	4	8	12	9	517	495	7
102	2	NA	2	NA	4	0.3	1	0.2	1.2	2	85	3	8	12	9	517	495	7
103	1.2	NA	2	NA	1	NA	NA	NA	2	2	NA	1	3	11	5	506	486	2
104	2	NA	2	NA	1	NA	NA	NA	2	2	NA	1	8	12	9	506	486	2
105	2	NA	2	NA	4	NA	NA	NA	2	2	NA	1	8	12	9	506	486	6

Table E.3 (cont'd)

106	2	NA	2	75	1	NA	NA	NA	1.3	2	NA	1	8	3	12	493	492	7
107	1.6	NA	2	75	4	0.7	1.3	0.6	1.2	2	80	4	8	12	9	506	486	2
108	1.2	NA	2	75	1	0.3	1.3	0.2	2	2	65	4	8	12	9	517	495	7
109	2	NA	2	NA	1	NA	NA	NA	2	2	NA	1	8	12	9	499	514	16
110	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	506	487	1
111	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	493	492	8
112	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	493	492	8
113	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	492	489	1
114	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	492	489	1
115	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	492	489	1
116	2	NA	2	NA	4	0.7	1.3	0.3	1.2	2	95	1	8	12	9	492	489	1
117	2	NA	2	NA	1	NA	NA	NA	1.3	2	NA	1	8	12	9	506	486	1
118	2	NA	2	NA	1	1	1.3	1	2	2	60	1	2	8	5	524	514	1
119	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	508	486	6
120	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	508	486	3
121	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	494	492	7

APPENDIX F

Table F.1: Frank's Ruin Projectile Point (Variables 1-19)

Bag#	Lot#	Art.#	Prov.	St.#	Ft.	R.M.	Col.	Cor.	Con.	PT	FTO	FTN	Len.	Wid.	Thk.	W.	BW	BT
139	34	1	5	NA	NA	8	30	1	2	9	88	88	1.02	1.36	0.33	0.5	1.3	0.3
77	1	2	1	NA	NA	1	7	1	3	8	88	88	1.98	1.11	0.28	0.7	0.99	0.14
77	1	3	1	NA	NA	1	17	1	1	8	88	88	2	1.27	0.39	0.7	1.27	0.25
906	130	4	4	NA	NA	6	18	1	3	3	88	88	1.82	1.26	0.41	0.9	1.07	0.23
62	18	5	4	1	NA	1	17	1	3	3	88	88	1.76	1.1	0.3	0.4	1	0.15
837	112	6	1	5	NA	1	2	1	1	3	88	88	2.52	1.07	0.33	7	1.07	0.19
761	120	7	11	NA	NA	1	3	1	3	3	88	88	1.42	0.87	0.23	0.2	0.85	0.2
761	6	8	11	NA	NA	1	18	1	3	3	88	88	2.9	1.2	0.45	1.1	1.2	0.28
10	14	9	4	NA	NA	8	30	1	3	3	88	88	1.93	0.96	0.26	0.5	0.95	0.2
662	105	10	11	NA	NA	1	2	1	1	3	88	88	2.31	1.18	0.47	1.2	1.18	0.2
440	84	11	1	5	NA	2	19	1	1	3	88	88	1.67	1.26	0.35	0.5	1.25	0.24
556	100	12	1	3	NA	8	30	1	1	1	88	88	3.14	2.38	0.65	3.7	1.79	0.55
19	3	13	5	NA	NA	2	19	1	3	8	88	88	2.1	1.33	0.47	1.2	1.33	0.32
571	80	14	11	NA	NA	6	18	1	5	3	88	88	1.72	1.21	0.32	0.5	1.14	0.29

Table F.2: Frank's Ruin Projectile Point (Variables 20 -38)

Art.#	BS	HL	HWD	HWP	HT	HBS	HG	SW	ST	SS	BL	BW	BT	BS	LER	LRT	LIR	LT	LEA
1	1	1.09	1.28	1.34	0.33	1	2	NA	NA	NA	NA	NA	NA	NA	NA	1	1	1.2	45
2	3	0.64	0.94	1.07	0.14	2	1.9	NA	NA	NA	1.34	1.05	0.24	2	1	1,2	1	1.1	55
3	1	0.33	1.25	1.27	0.32	2	1.9	NA	NA	NA	1.67	1.22	0.36	2	1	1,3	1	2	50
4	3	0.96	0.72	1.23	0.29	2	2	1.13	0.4	3	0.85	1.11	0.36	1	1	1,2	1	2	55
5	2	0.53	0.95	1.02	0.16	2	1.9	1.08	0.2	4	1.02	0.94	0.21	9	1	1,3	1	1.4	50
6	3	0.63	0.61	1.05	0.22	NA	2	1	0.32	1	1.99	1	0.33	2	1	1	1	2	50
7	3	0.67	0.47	0.83	0.24	NA	1.7	0.74	0.22	3	0.8	0.72	0.22	2	1	2,1	1	1.2	45
8	2	0.86	0.75	1.2	0.35	NA	1.6	1.04	0.4	1	1.89	0.96	0.44	2	1	1,2,3	1	1.2	55
9	1	0.74	0.59	0.96	0.2	NA	1.3	0.83	0.26	3	1.2	0.83	0.26	2	1	1	1	2	45
10	3	0.85	0.9	1.18	0.38	NA	1.5	1.18	0.46	3	1.6	1.13	0.44	2	1	1,2	1	1.3	70
11	2	0.72	0.7	1.26	0.33	NA	1.2	0.99	0.34	3	0.97	0.9	0.32	2	1	1,3	1	1.1	65
12	3	1.12	1.36	1.8	0.57	2	1.8	2.38	0.66	6	2.15	1.92	0.65	2,6	1	1	1	2	65
13	3	0.55	1.28	1.33	0.42	2	1.7	NA	NA	NA	1.57	1.23	0.43	2	1	1,2	1	1.2	60
14	2	0.6	1	1	0.28	2	2	1.17	0.31	1	1.2	1	0.31	2	1	1,2	1	2	35

Table F.3: Frank's Ruin Projectile Point (Variables 39 -57)

Art.#	LBS	LN	RER	RRT	RIR	RT	REA	RBS	RN	BN	OS	TS	Lon.S	E	N	L	Com	Sym	BFP
1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9	11	9	506	486	6	NA	2	NA
2	1	NA	1	1,2	1	1.1	35	1	NA	NA	5	11	5	492	489	1	NA	2	4
3	1	NA	1	1,2	1	1.2	50	1	NA	NA	5	8	1	492	489	1	NA	3	4
4	1	0.24	1	1,2,3	1	1.1	55	1	0.24	NA	NA	8	5	516	496	1	NA	2	6
5	5	NA	1	1	1	1.5	40	NA	0.09	NA	9	8	5	518	494	2	NA	5	6
6	1	1.9	1	1,2	1	2	45	1	0.24	NA	5	8	5	494	492	12	NA	2	4
7	1	0.14	1	1,3,2	1	1.1	40	1	0.19	NA	5	11	5	524	514	1	NA	2	4
8	1	0.18	1	1,2	1	1.2	45	1	0.15	NA	5	8	5	524	514	1	NA	1	4
9	1	0.14	1	1	1	2	55	1	0.11	NA	5	8	5	517	492	1	NA	1	4
10	1	0.15	1	1,2	1	1.2	70	1	0.1	NA	5	8	1	524	513	2	NA	2	4
11	3	0.2	1	1,2	1	1.1	55	1	0.14	NA	5	8	5	494	492	7	NA	2	6
12	2	NA	1	1,2	1	2	60	1	NA	NA	5	7	1	493	492	9	NA	3	4
13	1	NA	1	1	1	2	55	1	NA	NA	5	8	5	506	486	0.1	NA	2	4
14	1	0.21	1	1,2	1	1.1	45	1	NA	NA	5	11	5	524	513	1	NA	4	4

APPENDIX G

Table G.1: Pueblo de la Mesa Debitage (All Variables)

Note: CU = Clean- Up, BU = Burial

Bag	Lot	Art.	Pv.	St.	Ft.	R.M.	Cl.	AT.	C.	FTO	Cr.	PS	DS	In.	Ter.	FTN	LD	W	E	N	L
159	17	1	1	NA	NA	7	4	1	6	4	1	NA	4	NA	1	88	20	0.1	515	531	2
159	17	2	1	NA	NA	12	7	1	5	4	1	NA	2	NA	1	88	15	0.2	515	531	2
159	17	3	1	NA	NA	1	2	90	9	5	1	NA	NA	NA	2	11	20	2	515	531	2
159	17	4	1	NA	NA	1	7	1	3	3	1	1	6	3	2	88	25	1.4	515	531	2
159	17	5	1	NA	NA	1	7	1	5	4	1	NA	4	NA	3	88	10	0.1	515	531	2
159	17	6	1	NA	NA	1	2	1	4	4	1	NA	6	NA	2	2	20	0.6	515	531	2
159	17	7	1	NA	NA	1	2	1	1	4	1	3	4	2	1	88	20	0.6	515	531	2
881	132	8	1	NA	NA	4	3	1	1	3	2	0	9	3	1	4	35	3.8	515	531	3
881	132	9	1	NA	NA	4	4	1	4	4	2	NA	4	NA	2	88	40	3.1	515	531	3
881	132	10	1	NA	NA	1	2	1	3	4	1	2	6	3	2	88	20	0.4	515	531	3
881	132	11	1	NA	NA	2	19	1	3	3	2	0	2	2	2	88	15	0.1	515	531	3
881	132	12	1	NA	NA	1	8	1	1	3	2	0	3	2	1	88	20	0.5	515	531	3
881	132	13	1	NA	NA	1	2	1	4	4	1	NA	3	NA	2	88	15	0.2	515	531	3
881	132	14	1	NA	NA	1	2	1	1	3	2	1	6	2	3	5	25	0.8	515	531	3
881	132	15	1	NA	NA	4	4	1	4	4	1	NA	1	NA	2	88	25	1.5	515	531	3
881	132	16	1	NA	NA	1	2	90	9	5	1	NA	NA	NA	2	11	20	0.8	515	531	3
182	30	17	1	NA	NA	2	19	1	1	3	1	1	3	3	3	88	15	0.4	515	531	3
182	30	18	1	NA	NA	1	5	1	1	3	2	0	5	2	1	88	15	0.1	515	531	3
182	30	19	1	NA	NA	1	15	1	4	4	2	NA	4	NA	2	88	20	0.2	515	531	3
103	21	20	1	NA	NA	1	5	1	4	4	1	NA	7	NA	2	88	20	0.4	515	531	1
103	21	21	1	NA	NA	1	4	1	1	3	2	1	4	2	1	88	20	0.4	515	531	1
103	21	22	1	NA	NA	12	7	1	1	3	1	1	3	3	1	3	25	0.6	515	531	1
103	21	23	1	NA	NA	1	11	90	9	5	1	NA	NA	NA	2	11	15	0.2	515	531	1
103	21	24	1	NA	NA	1	18	1	3	3	1	1	4	3	2	88	15	0.1	515	531	1
103	21	25	1	NA	NA	1	2	1	3	3	1	1	5	3	2	88	15	0.2	515	531	1
103	21	26	1	NA	NA	1	2	1	5	4	3	NA	3	NA	3	88	20	0.6	515	531	1
103	21	27	1	NA	NA	1	2	1	3	3	1	1	6	3	2	88	20	1	515	531	1
103	21	28	1	NA	NA	7	4	1	1	4	1	2	5	2	1	88	15	0.1	515	531	1
103	21	29	1	NA	NA	1	7	1	5	4	1	NA	2	NA	1	88	20	0.4	515	531	1

Table G.1 (cont'd)

103	21	30	1	NA	NA	1	4	1	3	3	3	2	0	6	3	2	88	20	0.4	515	531	1
103	21	31	1	NA	NA	1	2	1	5	4	3	3	NA	3	NA	1	88	20	0.4	515	531	1
103	21	32	1	NA	NA	1	2	1	1	3	1	2	NA	2	NA	2	88	15	0.3	515	531	1
103	21	33	1	NA	NA	1	2	1	4	4	2	NA	NA	2	NA	2	88	15	0.3	515	531	1
103	21	34	1	NA	NA	1	2	90	9	5	1	NA	NA	NA	NA	2	11	15	0.4	515	531	1
103	21	35	1	NA	NA	4	4	1	5	4	1	NA	NA	3	NA	1	88	20	0.8	515	531	1
103	21	36	1	NA	NA	1	6	1	5	4	1	NA	NA	4	NA	1	88	15	0.3	515	531	1
103	21	37	1	NA	NA	1	2	1	4	4	1	NA	NA	4	NA	2	88	20	0.5	515	531	1
103	21	38	1	NA	NA	1	2	90	9	5	1	NA	NA	NA	NA	2	11	15	0.3	515	531	1
103	21	39	1	NA	NA	1	3	1	3	3	1	1	1	5	3	2	88	20	0.7	515	531	1
103	21	40	1	NA	NA	1	7	1	5	4	1	NA	NA	6	NA	1	88	20	0.5	515	531	1
103	21	41	1	NA	NA	2	19	1	4	4	1	NA	NA	3	NA	1	88	15	0.1	515	531	1
103	21	42	1	NA	NA	1	2	90	9	5	2	NA	NA	NA	NA	2	11	20	1.7	515	531	1
103	21	43	1	NA	NA	1	2	1	5	4	2	NA	NA	4	NA	1	88	30	1.5	515	531	1
103	21	44	1	NA	NA	1	11	1	5	4	3	NA	NA	1	NA	1	88	25	1.1	515	531	1
103	21	45	1	NA	NA	1	3	1	3	3	2	2	2	6	3	2	88	25	3.2	515	531	1
103	21	46	1	NA	NA	1	2	1	1	3	2	1	1	5	2	1	88	20	0.6	515	531	1
103	21	47	1	NA	NA	4	4	1	5	4	1	NA	NA	7	NA	1	88	25	0.9	515	531	1
103	21	48	1	NA	NA	4	4	1	5	4	1	NA	NA	3	NA	1	88	15	0.3	515	531	1
103	21	49	1	NA	NA	1	11	1	5	4	1	NA	NA	4	NA	3	88	15	0.1	515	531	1
103	21	50	1	NA	NA	1	2	1	5	4	4	NA	NA	0	NA	1	88	25	2.8	515	531	1
103	21	51	1	NA	NA	1	2	1	5	4	1	NA	NA	3	NA	1	88	20	0.3	515	531	1
103	21	52	1	NA	NA	2	19	1	5	4	1	NA	NA	4	NA	1	88	25	0.7	515	531	1
103	21	53	1	NA	NA	1	2	90	9	5	1	NA	NA	NA	NA	2	11	20	0.3	515	531	1
103	21	54	1	NA	NA	2	19	1	1	3	3	3	3	3	2	1	88	25	1.1	515	531	1
103	21	55	1	NA	NA	1	2	1	5	4	1	NA	NA	7	NA	3	88	20	0.4	515	531	1
103	21	56	1	NA	NA	1	2	1	3	3	1	2	2	5	3	2	88	20	0.4	515	531	1
103	21	57	1	NA	NA	1	2	1	5	4	1	NA	NA	5	NA	3	88	25	1.1	515	531	1
103	21	58	1	NA	NA	2	19	1	1	3	1	1	1	7	3	1	88	20	0.4	515	531	1
103	21	59	1	NA	NA	1	2	1	5	4	2	NA	NA	2	NA	1	88	25	1.3	515	531	1
103	21	60	1	NA	NA	1	2	1	3	3	2	2	2	4	3	2	88	25	1	515	531	1
103	21	61	1	NA	NA	4	4	1	1	3	1	1	1	6	3	1	88	35	3.3	515	531	1
103	21	62	1	NA	NA	1	2	1	4	4	1	NA	NA	6	NA	2	4	30	5.4	515	531	1
103	21	63	1	NA	NA	4	4	1	3	3	3	4	1	0	3	2	88	35	4.4	515	531	1

Table G.1 (cont'd)

Year (Year)	103	21	64	1	NA	NA	1	1	2	1	1	3	3	3	3	2	6	3	1	88	20	1	515	531	1
	103	21	65	1	NA	NA	1	1	2	1	3	3	3	1	2	7	3	2	88	30	2.2	515	531	1	
	103	21	66	1	NA	NA	1	1	2	1	5	4	4	2	NA	9	NA	3	2	88	30	2.1	515	531	1
	103	21	67	1	NA	NA	1	1	2	1	4	4	4	1	NA	5	NA	2	88	30	2.2	515	531	1	
	103	21	68	1	NA	NA	2	1	90	9	5	5	5	1	NA	NA	NA	2	11	20	1.4	515	531	1	
	103	21	69	1	NA	NA	1	1	2	1	3	3	3	2	0	4	3	2	4	25	1	515	531	1	
	103	21	70	1	NA	NA	2	19	1	5	4	4	4	2	NA	8	NA	1	4	30	2	515	531	1	
	103	21	71	1	NA	NA	1	1	2	1	3	3	3	1	2	6	2	2	88	20	0.7	515	531	1	
	103	21	72	1	NA	NA	4	4	4	1	3	3	3	2	1	6	3	2	88	50	16.5	515	531	1	
	103	21	73	1	NA	NA	2	19	90	9	5	5	5	2	NA	NA	NA	2	11	2	20	0.5	515	531	1
	103	21	74	1	NA	NA	1	1	2	1	5	4	4	3	NA	2	NA	1	88	30	4.5	515	531	1	
	103	21	75	1	NA	NA	2	19	1	5	5	4	4	2	NA	9	NA	3	2	88	20	0.8	515	531	1
	103	21	76	1	NA	NA	12	19	1	4	4	4	4	2	NA	5	NA	2	88	35	3.4	515	531	1	
	103	21	77	1	NA	NA	1	1	2	90	9	5	5	2	NA	NA	NA	2	11	2	15	0.4	515	531	1
	103	21	78	1	NA	NA	1	33	1	5	4	4	4	1	NA	6	NA	1	88	25	1.5	515	531	1	
	103	21	79	1	NA	NA	2	19	90	9	5	5	5	1	NA	NA	NA	2	11	2	20	0.5	515	531	1
	103	21	80	1	NA	NA	1	1	2	1	5	4	4	2	NA	6	NA	1	88	25	2.3	515	531	1	
	257	48	81	2	NA	NA	1	1	2	1	4	4	4	4	NA	0	NA	2	88	25	1.3	504	500	1	
	257	48	82	2	NA	NA	2	7	1	5	5	4	4	1	NA	7	NA	1	88	20	0.5	504	500	1	
	257	48	83	2	NA	NA	1	4	1	5	5	4	4	1	NA	2	NA	1	88	20	0.2	504	500	1	
	257	48	84	2	NA	NA	1	1	2	1	5	4	4	3	NA	4	NA	1	88	25	1.6	504	500	1	
	257	48	85	2	NA	NA	2	19	1	1	1	3	3	4	1	0	3	1	88	25	0.7	504	500	1	
	257	48	86	2	NA	NA	1	1	2	1	4	4	4	1	NA	1	NA	2	88	15	0.1	504	500	1	
	257	48	87	2	NA	NA	1	1	5	1	1	3	3	1	1	4	3	1	88	15	0.1	504	500	1	
	257	48	88	2	NA	NA	1	1	7	5	5	4	4	3	NA	2	NA	1	88	10	0.1	504	500	1	
257	48	89	2	NA	NA	1	1	3	1	3	3	3	1	1	3	3	2	88	15	0.2	504	500	1		
257	48	90	2	NA	NA	1	1	4	1	1	3	3	1	2	6	2	1	88	15	0.1	504	500	1		
257	48	91	2	NA	NA	1	1	7	1	4	4	4	1	NA	6	NA	2	88	20	0.6	504	500	1		
257	48	92	2	NA	NA	1	1	2	1	4	4	4	1	NA	8	NA	2	88	20	0.3	504	500	1		
257	48	93	2	NA	NA	1	1	2	1	5	4	4	1	NA	3	NA	1	88	10	0.1	504	500	1		
257	48	94	2	NA	NA	1	1	5	1	5	4	4	1	NA	7	NA	1	88	15	0.1	504	500	1		
257	48	95	2	NA	NA	1	1	2	1	5	4	4	1	NA	3	NA	1	88	20	0.5	504	500	1		
257	48	96	2	NA	NA	1	1	7	1	5	4	4	1	NA	4	NA	1	88	10	0.1	504	500	1		
257	48	97	2	NA	NA	1	1	2	1	5	4	4	1	NA	3	NA	1	88	15	0.3	504	500	1		

Table G.1 (cont'd)

257	48	98	2	NA	NA	1	2	1	3	3	3	1	2	NA	4	2	88	15	0.1	504	500	1
257	48	99	2	NA	NA	1	2	1	4	4	4	2	NA	NA	4	NA	2	88	20	0.2	504	500
257	48	100	2	NA	NA	2	19	1	3	3	3	1	2	6	3	2	88	15	0.1	504	500	
257	48	101	2	NA	NA	1	2	1	4	4	4	2	1	3	NA	2	88	10	0.1	504	500	
257	48	102	2	NA	NA	1	4	1	3	3	3	1	4	6	3	2	88	20	0.5	504	500	
257	48	103	2	NA	NA	3	9	1	7	3	3	1	1	3	3	1	88	15	0.3	504	500	
257	48	104	2	NA	NA	1	2	1	1	3	3	2	6	6	3	1	88	25	2.2	504	500	
257	48	105	2	NA	NA	1	2	1	5	4	4	1	NA	4	NA	1	88	15	0.2	504	500	
257	48	106	2	NA	NA	1	2	1	4	4	4	2	NA	2	NA	2	88	20	0.4	504	500	
257	48	107	2	NA	NA	1	2	1	4	4	4	1	NA	2	NA	2	88	20	1.2	504	500	
257	48	108	2	NA	NA	1	2	1	4	4	4	3	NA	5	NA	2	88	25	1.8	504	500	
257	48	109	2	NA	NA	1	2	1	5	4	4	3	NA	2	NA	1	88	25	1.2	504	500	
257	48	110	2	NA	NA	2	19	1	3	3	3	2	2	3	3	2	88	15	0.1	504	500	
257	48	111	2	NA	NA	1	5	1	4	4	4	1	NA	6	NA	2	88	20	0.5	504	500	
416	68	112	2	NA	NA	1	2	1	1	3	3	1	3	3	3	3	88	20	0.7	504	500	
395	62	113	2	NA	NA	1	7	1	1	3	3	1	1	4	3	1	88	25	1.1	504	500	
395	62	114	2	NA	NA	1	2	1	5	4	4	2	NA	3	NA	1	88	20	0.4	504	500	
395	62	115	2	NA	NA	1	2	1	5	4	4	1	NA	3	NA	1	88	15	0.2	504	500	
395	62	116	2	NA	NA	1	2	1	1	3	3	3	0	2	3	1	88	20	0.5	504	500	
395	62	117	2	NA	NA	1	2	1	5	4	4	2	NA	7	NA	4	88	20	0.6	504	500	
395	62	118	2	NA	NA	1	20	1	3	3	3	1	2	6	3	2	88	20	0.3	504	500	
395	62	119	2	NA	NA	1	2	1	4	4	4	1	NA	3	NA	2	88	20	0.9	504	500	
395	62	120	2	NA	NA	1	2	1	4	4	4	1	NA	4	NA	2	88	20	0.8	504	500	
395	62	121	2	NA	NA	1	2	1	5	4	4	2	NA	6	NA	1	4	35	2.7	504	500	
395	62	122	2	NA	NA	1	2	1	1	3	3	3	0	1	3	1	88	30	2.3	504	500	
395	62	123	2	NA	NA	1	2	1	3	3	3	1	3	9	3	2	88	25	2.2	504	500	
395	62	124	2	NA	NA	1	2	90	9	5	5	2	NA	NA	NA	2	11	25	2.5	504	500	
917	136	125	2	NA	NA	1	7	1	3	3	3	3	30	3	3	2	88	15	0.7	517	496	
917	136	126	2	NA	NA	7	4	1	1	3	3	1	1	5	2	1	88	20	0.3	517	496	
917	136	127	2	NA	NA	1	15	1	1	3	3	1	1	5	3	1	88	15	0.1	517	496	
917	136	128	2	NA	NA	1	7	1	5	4	4	2	NA	6	NA	1	88	25	1.7	517	496	
917	136	129	2	NA	NA	2	4	1	3	3	3	1	1	5	2	2	88	15	0.3	517	496	
1200	177	130	2	NA	NA	1	4	1	1	3	3	4	0	0	2	1	88	20	0.2	517	496	
1200	177	131	2	NA	NA	1	2	1	3	3	3	1	1	5	2	2	88	15	0.4	517	496	

Table G.1 (cont'd)

1200	177	132	2	NA	NA	1	2	1	5	4	1	NA	6	NA	1	88	20	0.6	517	496	4
1200	177	133	2	NA	NA	1	2	1	4	4	1	NA	5	NA	2	88	20	0.5	517	496	4
1200	177	134	2	NA	NA	1	2	1	1	3	2	0	6	3	3	88	20	0.8	517	496	4
1200	177	135	2	NA	NA	1	2	1	5	4	1	NA	6	NA	1	88	25	1	517	496	4
1200	177	136	2	NA	NA	1	2	90	9	5	3	NA	NA	NA	2	11	20	0.9	517	496	4
1200	177	137	2	NA	NA	2	19	1	4	4	1	NA	5	NA	2	88	20	0.4	517	496	4
1200	177	138	2	NA	NA	1	7	1	4	4	1	NA	6	NA	2	88	20	0.3	517	496	4
1200	177	139	2	NA	NA	1	2	1	5	4	2	NA	4	NA	1	88	15	0.4	517	496	4
1200	177	140	2	NA	NA	1	2	1	5	4	2	NA	7	NA	1	88	20	1.5	517	496	4
1200	177	141	2	NA	NA	6	7	1	3	3	1	1	4	3	2	88	25	1.4	517	496	4
1200	177	142	2	NA	NA	1	2	1	4	4	2	NA	3	NA	2	88	20	0.7	517	496	4
1200	177	143	2	NA	NA	1	2	1	5	4	1	NA	4	NA	1	2	25	0.8	517	496	4
1200	177	144	2	NA	NA	4	4	1	5	4	1	NA	5	NA	1	88	20	0.8	517	496	4
1200	177	145	2	NA	NA	2	19	1	4	4	2	NA	5	NA	2	88	25	1.1	517	496	4
1200	177	146	2	NA	NA	1	4	1	3	3	2	0	5	3	2	88	20	0.5	517	496	4
1200	177	147	2	NA	NA	1	2	90	9	5	2	NA	NA	NA	2	11	20	0.6	517	496	4
1200	177	148	2	NA	NA	1	3	1	1	3	2	0	6	2	1	4	40	3.6	517	496	4
1200	177	149	2	NA	NA	1	2	1	4	4	2	NA	4	NA	2	88	25	1.4	517	496	4
1200	177	150	2	NA	NA	2	19	1	5	4	2	NA	2	NA	2	88	20	0.3	517	496	4
1200	177	151	2	NA	NA	1	2	1	5	4	2	NA	7	NA	1	88	25	1.7	517	496	4
1200	177	152	2	NA	NA	1	2	1	1	3	3	2	5	2	1	88	30	2.7	517	496	4
1200	177	153	2	NA	NA	3	15	1		3	3	1	4	3	2	4	25	3.2	517	496	4
1035	157	154	2	NA	NA	1	3	1	4	4	1	NA	5	NA	2	88	20	0.2	517	496	2
1035	157	155	2	NA	NA	1	2	90	9	5	2	NA	NA	NA	2	11	20	0.3	517	496	2
1035	157	156	2	NA	NA	1	2	90	9	5	1	NA	NA	NA	2	11	15	0.6	517	496	2
1035	157	157	2	NA	NA	1	2	1	5	4	1	NA	6	NA	1	88	20	0.5	517	496	2
1035	157	158	2	NA	NA	1	2	1	5	4	4	NA	0	NA	3	88	25	3.5	517	496	2
1141	167	159	2	NA	NA	1	2	90	9	5	2	NA	NA	NA	2	11	25	0.6	517	496	3
1141	167	160	2	NA	NA	1	19	1	1	3	1	1	4	3	1	88	20	0.3	517	496	3
1253	190	161	2	NA	NA	2	19	1	4	4	1	NA	3	NA	2	88	20	0.2	517	496	5
1253	190	162	2	NA	NA	1	2	1	1	3	2	0	3	3	1	88	15	0.4	517	496	5
1253	190	163	2	NA	NA	1	15	1	5	4	1	NA	5	NA	1	88	15	0.1	517	496	5
1253	190	164	2	NA	NA	1	2	90	9	5	2	NA	NA	NA	2	11	15	0.3	517	496	5
1253	190	165	2	NA	NA	3	6	1	5	4	1	NA	7	NA	1	88	20	0.5	517	496	5

Table G.1 (cont'd)

1253	190	166	2	NA	NA	1	2	1	4	4	2	NA	3	NA	2	88	20	0.2	517	496	5
1253	190	167	2	NA	NA	1	2	1	1	3	3	2	1	3	3	88	15	0.4	517	496	5
1253	190	168	2	NA	NA	1	2	90	9	5	1	NA	NA	NA	2	11	25	1.1	517	496	5
1253	190	169	2	NA	NA	1	2	1	5	4	1	NA	3	NA	1	88	15	0.1	517	496	5
1253	190	170	2	NA	NA	1	2	1	3	3	2	0	4	3	2	88	20	0.2	517	496	5
1253	190	171	2	NA	NA	1	2	1	3	3	1	1	3	3	2	5	25	1.5	517	496	5
1253	190	172	2	NA	NA	1	19	1	5	4	2	NA	5	NA	1	88	20	0.5	517	496	5
1253	190	173	2	NA	NA	1	2	1	4	4	2	NA	3	NA	2	88	25	1.3	517	496	5
1253	190	174	2	NA	NA	1	7	1	1	3	1	3	3	3	1	88	20	0.6	517	496	5
1253	190	175	2	NA	NA	1	7	90	9	5	1	NA	NA	NA	2	11	15	0.4	517	496	5
1253	190	176	2	NA	NA	2	19	1	3	3	1	3	4	3	2	88	20	0.4	517	496	5
1253	190	177	2	NA	NA	1	2	1	4	4	1	NA	3	NA	2	88	20	0.3	517	496	5
1253	190	178	2	NA	NA	1	7	1	4	4	3	NA	3	NA	2	88	15	0.3	517	496	5
1253	190	179	2	NA	NA	1	7	1	1	3	3	1	4	3	2	88	10	0.1	517	496	5
1253	190	180	2	NA	NA	3	9	1	5	4	1	NA	4	NA	1	88	20	0.7	517	496	5
1253	190	181	2	NA	NA	2	19	1	5	4	2	NA	6	NA	1	88	25	0.8	517	496	5
1253	190	182	2	NA	NA	2	19	1	3	3	2	2	1	3	2	88	20	0.9	517	496	5
1253	190	183	2	NA	NA	2	19	1	4	4	1	NA	4	NA	2	2	20	0.3	517	496	5
1253	190	184	2	NA	NA	1	2	1	5	4	1	NA	4	NA	3	88	20	0.3	517	496	5
1253	190	185	2	NA	NA	1	2	1	1	3	1	0	4	3	1	88	20	1.2	517	496	5
1253	190	186	2	NA	NA	1	7	90	9	5	1	NA	NA	NA	2	11	15	0.2	517	496	5
1253	190	187	2	NA	NA	2	19	1	5	4	3	NA	2	NA	1	88	20	0.8	517	496	5
1253	190	188	2	NA	NA	1	2	1	5	4	3	NA	2	NA	1	88	20	0.7	517	496	5
1253	190	189	2	NA	NA	1	2	1	5	4	1	NA	8	NA	1	2	20	1	517	496	5
1353	195	190	2	NA	NA	1	5	1	5	4	1	1	5	3	2	88	20	0.1	517	496	6
1353	195	191	2	NA	NA	1	2	1	3	3	1	1	4	3	2	88	20	0.6	517	496	6
1353	195	192	2	NA	NA	2	19	1	4	4	1	NA	4	NA	2	88	15	0.3	517	496	6
1353	195	193	2	NA	NA	1	2	1	4	4	1	NA	4	NA	2	88	15	0.1	517	496	6
1353	195	194	2	NA	NA	2	4	1	5	4	1	NA	4	NA	1	88	20	0.8	517	496	6
1353	195	195	2	NA	NA	1	2	1	1	3	1	2	5	3	1	5	25	0.7	517	496	6
1353	195	196	2	NA	NA	1	2	1	5	4	2	NA	4	NA	1	88	20	0.6	517	496	6
1353	195	197	2	NA	NA	1	2	1	5	4	2	NA	6	NA	1	88	25	1.2	517	496	6
1353	195	198	2	NA	NA	2	19	1	3	3	3	2	6	3	2	88	20	0.4	517	496	6
1353	195	199	2	NA	NA	2	19	1	3	3	1	1	3	3	2	4	20	1.3	517	496	6

Table G.1 (cont'd)

1353	195	200	2	NA	NA	2	19	1	5	4	1	NA	4	NA	1	88	25	1.3	517	496	6
1353	195	201	2	NA	NA	2	19	1	5	4	1	NA	9	NA	4	88	20	0.3	517	496	6
1353	195	202	2	NA	NA	1	2	1	3	3	2	0	6	3	2	88	40	4.7	517	496	6
1353	195	203	2	NA	NA	1	2	1	1	3	2	1	9	2	1	88	30	2.3	517	496	6
1145	168	204	2	NA	NA	3	9	1	3	3	1	1	4	3	2	88	30	1.8	518	496	3
1145	168	205	2	NA	NA	1	2	1	4	4	2	NA	5	NA	2	88	20	0.7	518	496	3
1208	178	206	2	NA	NA	1	3	1	4	4	1	NA	2	NA	2	88	15	0.1	518	496	4
1208	178	207	2	NA	NA	1	2	1	4	4	3	NA	1	NA	2	88	10	0.1	518	496	4
1208	178	208	2	NA	NA	1	2	1	5	4	2	NA	9	NA	1	88	25	1.6	518	496	4
1208	178	209	2	NA	NA	4	3	1	5	4	3	NA	5	NA	1	88	35	5.3	518	496	4
1208	178	210	2	NA	NA	1	2	90	9	5	1	NA	NA	NA	2	11	20	0.8	518	496	4
1208	178	211	2	NA	NA	1	7	1	5	4	1	NA	7	NA	1	88	15	0.3	518	496	4
1208	178	212	2	NA	NA	1	2	1	4	4	1	NA	4	NA	1	88	25	1.8	518	496	4
1208	178	213	2	NA	NA	1	2	1	4	4	2	NA	5	NA	2	88	20	0.3	518	496	4
1208	178	214	2	NA	NA	1	2	1	3	3	4	1	2	3	2	88	20	0.4	518	496	4
1262	191	215	2	NA	NA	1	3	1	1	3	1	1	7	3	3	4	30	3	518	496	5
1262	191	216	2	NA	NA	1	2	1	1	3	3	1	3	2	1	88	25	1.5	518	496	5
1262	191	217	2	NA	NA	1	2	1	5	4	1	NA	3	NA	1	88	15	0.1	518	496	5
1262	191	218	2	NA	NA	1	2	90	9	5	3	NA	NA	NA	2	11	20	0.8	518	496	5
1262	191	219	2	NA	NA	1	5	90	9	5	1	NA	NA	NA	2	11	20	0.3	518	496	5
1262	191	220	2	NA	NA	1	12	1	5	4	2	NA	5	NA	3	88	25	1.3	518	496	5
1262	191	221	2	NA	NA	12	11	1	3	3	2	2	5	3	2	88	20	0.8	518	496	5
1262	191	222	2	NA	NA	3	9	90	9	5	1	NA	NA	NA	2	11	15	0.2	518	496	5
1262	191	223	2	NA	NA	1	2	1	5	4	2	NA	2	NA	1	88	15	0.1	518	496	5
1262	191	224	2	NA	NA	6	18	90	9	5	1	NA	NA	NA	2	11	20	0.8	518	496	5
1262	191	225	2	NA	NA	1	2	90	9	5	1	NA	NA	NA	2	11	20	0.6	518	496	5
1262	191	226	2	NA	NA	1	2	1	4	4	2	NA	8	NA	1	88	20	1.4	518	496	5
1262	191	227	2	NA	NA	1	2	1	1	3	1	1	3	2	1	88	20	0.5	518	496	5
1262	191	228	2	NA	NA	1	2	1	5	4	2	NA	4	NA	1	88	25	0.9	518	496	5
1262	191	229	2	NA	NA	2	19	1	1	3	2	1	4	3	1	88	20	1.5	518	496	5
1262	191	230	2	NA	NA	1	2	1	5	4	1	NA	9	NA	1	2	20	0.8	518	496	5
1262	191	231	2	NA	NA	1	15	90	9	5	1	NA	NA	NA	2	11	15	0.4	518	496	5
1262	191	232	2	NA	NA	1	2	1	1	3	1	3	5	2	1	88	15	0.2	518	496	5
1262	191	233	2	NA	NA	2	19	1	1	3	1	1	3	3	3	88	20	0.4	518	496	5

1262	191	234	2	NA	NA	2	19	1	5	4	3	NA	3	NA	3	88	25	0.9	518	496	5
1262	191	235	2	NA	NA	1	2	1	4	4	1	NA	9	NA	2	88	20	1.1	518	496	5
1262	191	236	2	NA	NA	2	19	1	5	4	2	NA	6	NA	1	88	20	0.4	518	496	5
1262	191	237	2	NA	NA	1	2	1	1	3	2	0	5	3	1	5	25	0.9	518	496	5
1262	191	238	2	NA	NA	1	3	90	9	5	1	NA	NA	NA	2	11	15	0.2	518	496	5
1262	191	239	2	NA	NA	1	3	1	5	4	1	NA	3	NA	1	88	20	0.4	518	496	5
1262	191	240	2	NA	NA	2	19	1	1	3	3	0	5	1	1	2	25	1.8	518	496	5
1343	196	241	2	NA	NA	1	2	1	1	3	2	0	5	3	3	88	25	1.1	518	496	6
1343	196	242	2	NA	NA	1	2	1	4	4	1	NA	7	NA	2	88	25	1.1	518	496	6
1343	196	243	2	NA	NA	2	19	1	4	4	2	NA	3	NA	2	88	20	0.6	518	496	6
1343	196	244	2	NA	NA	1	2	1	3	3	1	1	5	2	2	88	20	0.4	518	496	6
1343	196	245	2	NA	NA	1	2	1	1	3	2	0	3	3	1	88	20	0.5	518	496	6
1343	196	246	2	NA	NA	2	19	90	9	5	2	NA	NA	NA	2	11	25	2.2	518	496	6
1343	196	247	2	NA	NA	1	2	1	5	4	3	NA	3	NA	1	88	25	1.2	518	496	6
1343	196	248	2	NA	NA	1	2	1	1	3	2	3	4	3	3	88	30	2.5	518	496	6
1343	196	249	2	NA	NA	1	2	1	5	4	2	NA	5	NA	1	88	30	4.1	518	496	6
1343	196	250	2	NA	NA	1	2	1	5	4	2	NA	3	NA	1	88	20	0.1	518	496	6
1343	196	251	2	NA	NA	1	2	1	5	4	3	NA	6	NA	1	88	25	1.9	518	496	6
1398	204	252	2	NA	NA	1	2	90	9	5	1	NA	NA	NA	2	11	20	0.8	518	496	7
1398	204	253	2	NA	NA	1	2	1	5	4	1	NA	5	NA	1	88	20	0.7	518	496	7
1398	204	254	2	NA	NA	1	7	1	5	4	1	NA	4	NA	1	88	10	0.1	518	496	7
1398	204	255	2	NA	NA	1	2	1	1	3	1	4	9	3	1	88	20	0.7	518	496	7
1398	204	256	2	NA	NA	1	2	1	5	4	3	NA	2	NA	3	88	25	2.2	518	496	7
1398	204	257	2	NA	NA	2	19	1	1	3	1	2	6	3	1	4	25	1.1	518	496	7
3666	573	258	11	5	NA	2	19	1	5	4	1	NA	6	NA	3	88	20	0.5	521	536	8
3666	573	259	11	5	NA	1	2	1	5	4	2	NA	3	NA	1	88	25	0.7	521	536	8
3666	573	260	11	5	NA	1	7	1	1	3	1	2	5	2	1	88	20	0.4	521	536	8

Table G.1 (cont'd)

3666	573	268	11	5	NA	1	4	1	5	4	2	NA	6	NA	3	4	30	3	521	536	8
4032	588	269	11	5	NA	1	2	1	4	4	1	NA	3	NA	2	88	20	0.2	521	536	11
4032	588	270	11	5	NA	1	2	1	5	4	1	NA	4	NA	1	88	15	0.2	521	536	11
3926	576	271	11	5	NA	1	2	1	1	3	3	4	7	3	1	4	45	9.4	521	536	BU4
3926	576	272	11	5	NA	2	19	1	1	3	1	1	2	3	1	88	10	0.1	521	536	BU4
3926	576	273	11	5	NA	8	31	1	5	4	1	NA	4	NA	1	9	10	0.1	521	536	BU4
3926	576	274	11	5	NA	1	2	1	4	4	1	NA	6	NA	2	2	30	1.7	521	536	BU4
2615	403	275	11	5	NA	1	2	1	4	4	1	NA	4	NA	2	88	20	0.6	521	536	CU
3461	522	276	11	5	NA	1	2	1	1	3	2	1	9	3	1	88	25	1.4	521	536	CU
3461	522	277	11	5	NA	7	4	1	5	4	1	NA	4	NA	1	88	35	2	521	536	CU
3461	522	278	11	5	NA	1	15	1	5	4	2	NA	8	NA	3	4	30	4.8	521	536	CU
3461	522	279	11	5	NA	1	2	1	5	4	1	NA	7	NA	3	1	30	1.8	521	536	CU
3816	553	280	11	5	NA	1	2	1	5	4	3	NA	2	NA	1	88	30	5.5	521	536	BU3
3816	553	281	11	5	NA	1	2	1	4	4	2	NA	9	NA	2	2	30	2.6	521	536	BU4
3428	498	282	11	5	NA	1	7	1	1	3	2	0	3	3	1	88	15	0.1	521	536	7B
3428	498	283	11	5	NA	1	2	1	5	4	1	NA	3	NA	3	88	20	0.6	521	536	7B
3428	498	284	11	5	NA	1	2	1	5	4	2	NA	4	NA	1	88	25	0.9	521	536	7B
3428	498	285	11	5	NA	1	2	1	5	4	1	NA	6	NA	3	88	30	1.1	521	536	7B
3428	498	286	11	5	NA	1	3	1	1	3	1	1	2	3	1	88	20	0.1	521	536	7B
3428	498	287	11	5	NA	1	2	90	9	5	1	NA	NA	NA	2	11	20	0.4	521	536	7B
3428	498	288	11	5	NA	1	2	1	5	4	2	NA	6	NA	1	88	20	0.9	521	536	7B
3428	498	289	11	5	NA	2	19	1	1	3	3	0	6	3	3	88	30	1.3	521	536	7B
3428	498	290	11	5	NA	2	19	1	1	3	2	1	6	3	1	88	30	1.2	521	536	7B
3428	498	291	11	5	NA	1	7	1	5	4	2	NA	6	NA	1	4	25	0.8	521	536	7B
3428	498	292	11	5	NA	1	2	1	4	4	2	NA	2	NA	2	88	25	1.6	521	536	7B
3428	498	293	11	5	NA	1	2	1	5	4	2	NA	5	NA	3	88	25	0.5	521	536	7B
3428	498	294	11	5	NA	1	7	1	1	3	1	1	6	3	1	88	20	0.5	521	536	7B
3428	498	295	11	5	NA	3	18	1	3	3	1	1	6	3	2	88	25	2.6	521	536	7B
3428	498	296	11	5	NA	1	2	1	5	4	4	NA	0	NA	3	88	30	3.1	521	536	7B
3428	498	297	11	5	NA	7	4	1	1	3	1	3	4	3	3	4	30	2.3	521	536	7B
3428	498	298	11	5	NA	1	3	1	4	4	1	NA	3	NA	2	2	35	2.6	521	536	7B
3428	498	299	11	5	NA	1	2	1	1	3	2	1	5	3	1	88	25	1.5	521	536	7B
3428	498	300	11	5	NA	1	2	1	1	3	1	2	3	3	3	4	35	1.6	521	536	7B
3428	498	301	11	5	NA	2	19	1	1	3	1	2	3	3	3	88	25	0.8	521	536	7B

Table G.1 (cont'd)

3428	498	302	11	5	NA	1	2	1	1	1	3	1	1	6	2	1	88	35	1.2	521	536	7B
3428	498	303	11	5	NA	1	2	1	1	5	4	1	NA	5	NA	3	88	25	0.7	521	536	7B
3428	498	304	11	5	NA	1	2	1	1	1	3	2	2	7	3	1	88	25	0.8	521	536	7B
3428	498	305	11	5	NA	1	2	1	1	5	4	2	NA	9	NA	1	88	50	11.9	521	536	7B
3428	498	306	11	5	NA	1	3	1	1	4	4	2	NA	4	NA	2	88	25	1	521	536	7B
3428	498	307	11	5	NA	1	2	90	1	9	5	1	NA	NA	NA	2	11	30	2.9	521	536	7B
3428	498	308	11	5	NA	3	11	1	1	4	4	2	NA	7	NA	2	88	35	5.9	521	536	7B
3428	498	309	11	5	NA	3	5	1	1	1	3	1	1	4	3	1	4	40	3	521	536	7B
2334	361	310	11	5	NA	1	5	1	1	1	3	1	2	4	2	3	88	20	0.1	521	536	5
2334	361	311	11	5	NA	2	19	1	1	4	4	2	NA	1	NA	2	88	20	0.3	521	536	5
2334	361	312	11	5	NA	1	2	1	1	4	4	2	NA	6	NA	2	4	25	3.1	521	536	5
2334	361	313	11	5	NA	1	3	1	1	5	4	1	NA	2	NA	1	88	20	0.1	521	536	5
2334	361	314	11	5	NA	1	2	90	1	9	5	1	NA	NA	NA	2	11	20	1.1	521	536	5
2334	361	315	11	5	NA	1	5	1	1	5	4	2	NA	4	NA	3	88	20	0.5	521	536	5
2334	361	316	11	5	NA	1	2	1	1	5	4	1	NA	6	NA	1	88	20	0.4	521	536	5
2334	361	317	11	5	NA	1	2	1	1	1	3	1	2	5	3	1	88	20	0.2	521	536	5
2334	361	318	11	5	NA	1	2	1	1	4	4	1	NA	4	NA	2	88	25	1	521	536	5
2334	361	319	11	5	NA	1	2	1	1	1	3	1	1	6	3	1	88	20	0.4	521	536	5
2334	361	320	11	5	NA	1	2	1	1	1	3	1	5	4	2	1	88	20	0.4	521	536	5
2334	361	321	11	5	NA	2	19	90	1	9	5	1	NA	NA	NA	2	11	15	0.2	521	536	5
2299	330	322	11	5	NA	1	7	1	1	1	3	1	1	4	3	3	88	15	0.4	521	536	4
2299	330	323	11	5	NA	1	2	1	1	5	4	1	NA	7	NA	1	88	25	0.7	521	536	4
2299	330	324	11	5	NA	1	3	1	1	1	3	2	3	8	3	1	88	20	1.4	521	536	4
2299	330	325	11	5	NA	1	2	1	1	1	3	1	2	7	3	1	88	25	0.7	521	536	4
2299	330	326	11	5	NA	1	2	1	1	4	4	2	NA	7	NA	2	88	25	1.8	521	536	4
2299	330	327	11	5	NA	1	2	1	1	1	3	2	1	3	3	1	88	25	1.2	521	536	4
2299	330	328	11	5	NA	1	2	1	1	1	3	2	2	8	3	3	4	30	2.6	521	536	4
2299	330	329	11	5	NA	1	2	1	1	1	3	1	1	7	3	1	88	30	1.8	521	536	4
3205	485	330	11	5	NA	2	19	1	1	4	4	2	NA	3	NA	2	88	25	1.1	521	536	7A
3205	485	331	11	5	NA	3	19	1	1	5	4	1	NA	3	NA	3	88	20	0.5	521	536	7A
3205	485	332	11	5	NA	1	2	90	1	9	5	1	NA	NA	NA	2	11	15	0.6	521	536	7A
3205	485	333	11	5	NA	1	2	1	1	3	3	2	1	6	2	2	88	30	1.9	521	536	7A
3205	485	334	11	5	NA	1	2	1	1	5	4	2	NA	8	3	3	4	30	2	521	536	7A
3256	482	335	11	5	NA	2	19	1	1	4	4	1	NA	5	NA	2	88	15	0.1	521	536	7A

Table G.1 (cont'd)

2054	311	336	11	5	NA	1	7	1	1	1	3	1	1	9	3	3	88	20	0.6	520	537	2
2054	311	337	11	5	NA	2	19	1	1	1	3	2	1	9	3	1	4	40	4.2	520	537	2
2054	311	338	11	5	NA	2	19	1	1	5	4	1	NA	7	NA	1	88	20	0.8	520	537	2
2054	311	339	11	5	NA	2	19	1	1	4	4	2	NA	4	NA	2	88	15	0.1	520	537	2
2054	311	340	11	5	NA	1	2	1	1	5	4	2	NA	3	NA	1	88	25	1.5	520	537	2
2054	311	341	11	5	NA	1	2	1	1	5	4	1	NA	8	NA	1	88	20	0.3	520	537	2
2054	311	342	11	5	NA	1	2	1	1	5	4	2	NA	6	NA	1	88	20	1.1	520	537	2
2054	311	343	11	5	NA	2	19	1	1	1	3	2	0	3	3	1	88	30	2.2	520	537	2
2115	320	344	11	5	NA	1	2	1	1	5	4	2	NA	3	NA	3	88	15	0.1	520	537	3
2115	320	345	11	5	NA	1	2	90	9	5	5	1	NA	NA	NA	2	11	25	1.5	520	537	3
2115	320	346	11	5	NA	2	1	1	1	5	4	2	NA	8	NA	1	88	20	0.2	520	537	3
2115	320	347	11	5	NA	1	2	1	1	3	3	2	5	5	3	2	88	25	2	520	537	3
2115	320	348	11	5	NA	1	2	1	1	5	4	2	NA	5	NA	3	88	20	0.7	520	537	3
2321	338	349	11	5	NA	1	2	1	1	5	4	1	NA	3	NA	1	88	15	0.1	520	537	4
2321	338	350	11	5	NA	1	2	1	1	5	4	1	NA	4	NA	3	88	35	1.4	520	537	4
2321	338	351	11	5	NA	2	19	90	9	5	5	2	NA	NA	NA	2	11	15	0.1	520	537	4
2321	338	352	11	5	NA	1	18	1	1	1	3	2	1	3	3	3	88	20	0.2	520	537	4
2321	338	353	11	5	NA	1	22	1	1	5	4	1	NA	3	NA	3	88	20	0.4	520	537	4
2321	338	354	11	5	NA	1	7	1	1	5	4	1	NA	6	NA	3	88	25	0.8	520	537	4
2321	338	355	11	5	NA	1	2	1	1	1	3	2	2	9	2	1	88	25	1.9	520	537	4
2341	360	356	11	5	NA	1	7	1	1	5	4	2	NA	9	NA	1	88	35	2.8	520	537	5
2341	360	357	11	5	NA	2	19	1	1	5	4	2	NA	8	NA	1	2	25	1.5	520	537	5
2341	360	358	11	5	NA	1	2	1	1	1	3	1	6	7	3	1	2	25	1.8	520	537	5
2918	447	359	11	5	NA	1	2	90	9	5	5	1	NA	NA	NA	2	11	25	0.6	520	537	7A
2918	447	360	11	5	NA	1	2	1	1	5	4	3	NA	3	NA	3	88	25	2.3	520	537	7A
3139	447	361	11	5	NA	1	2	1	1	3	3	2	NA	3	NA	1	88	20	0.2	520	537	7B
3224	487	362	11	5	NA	1	2	1	1	5	4	1	NA	4	NA	3	88	25	0.8	520	537	8B
3224	487	363	11	5	NA	1	2	1	1	5	4	1	NA	4	NA	1	3	35	1.3	520	537	8B
3224	487	364	11	5	NA	1	2	1	1	5	4	1	NA	8	NA	1	88	20	0.7	520	537	8B
3224	487	365	11	5	NA	4	3	1	1	3	3	2	2	4	3	2	88	25	1.8	520	537	8B
3224	487	366	11	5	NA	1	2	1	1	1	3	2	0	2	3	3	88	25	0.5	520	537	8B
3224	487	367	11	5	NA	1	2	1	1	1	3	2	1	8	3	3	88	20	1.1	520	537	8B
3224	487	368	11	5	NA	1	2	1	1	5	4	1	NA	2	NA	3	88	20	0.2	520	537	8B
3224	487	369	11	5	NA	2	7	1	1	1	3	1	2	5	3	3	88	20	0.4	520	537	8B

Table G.1 (cont'd)

3224	487	370	11	5	NA	7	4	90	9	5	1	NA	NA	NA	2	11	20	0.3	520	537	8B
3224	487	371	11	5	NA	16	19	90	9	5	1	NA	NA	NA	2	11	25	0.3	520	537	8B
3632	537	372	11	5	NA	2	7	1	1	3	1	1	3	3	2	88	25	0.5	520	537	9
3632	537	373	11	5	NA	1	2	90	9	5	1	NA	NA	NA	2	11	15	0.2	520	537	9
3632	537	374	11	5	NA	1	2	1	5	4	1	NA	5	NA	3	88	25	0.3	520	537	9
3632	537	375	11	5	NA	7	4	1	5	4	1	NA	6	NA	1	88	30	0.5	520	537	9
3632	537	376	11	5	NA	1	15	1	3	3	1	1	8	3	2	9	20	0.1	520	537	9
3632	537	377	11	5	NA	1	2	1	1	3	1	3	3	3	1	88	25	0.4	520	537	9
3632	537	378	11	5	NA	1	2	1	1	3	2	2	9	3	1	4	30	1.9	520	537	9
3632	537	379	11	5	NA	1	2	1	5	4	3	NA	2	NA	1	88	25	1.5	520	537	9
3632	537	380	11	5	NA	1	2	1	1	3	3	2	3	3	1	88	25	1.2	520	537	9
3632	537	381	11	5	NA	1	2	1	5	4	2	NA	3	NA	1	88	20	0.3	520	537	9
3632	537	382	11	5	NA	1	2	1	5	4	1	NA	5	NA	1	88	20	0.3	520	537	9
3945	572	383	11	5	NA	1	2	1	4	4	2	NA	5	NA	2	88	35	1.3	520	537	10
3945	572	384	11	5	NA	1	2	1	5	4	2	NA	4	NA	1	4	35	4.2	520	537	10
3945	572	385	11	5	NA	1	20	1	5	4	2	NA	6	NA	1	5	50	6.2	520	537	10
4052	595	386	11	5	NA	1	2	1	5	4	2	NA	9	NA	1	88	30	1.9	520	537	11
4052	595	387	11	5	NA	1	2	1	1	3	1	1	5	3	3	88	20	0.2	520	537	11
4052	595	388	11	5	NA	1	2	1	1	3	1	4	5	3	3	5	35	4.1	520	537	11
2609	405	389	11	5	NA	1	2	1	1	3	2	2	5	3	1	88	15	0.3	520	537	CU
2609	405	390	11	5	NA	1	2	1	5	4	2	NA	6	NA	1	88	25	1.1	520	537	CU
2089	299	391	10	4	NA	1	2	1	1	3	2	0	3	3	3	88	25	0.5	517	507	2
2089	299	392	10	4	NA	1	2	90	9	5	1	NA	NA	NA	2	11	20	0.4	517	507	2
2089	299	393	10	4	NA	1	4	1	4	4	3	NA	1	NA	2	88	25	1	517	507	2
2089	299	394	10	4	NA	2	19	1	4	4	1	NA	2	NA	2	88	15	0.2	517	507	2
2089	299	395	10	4	NA	1	4	1	1	3	1	2	5	3	1	88	20	0.3	517	507	2
2089	299	396	10	4	NA	1	7	1	1	3	1	1	8	3	3	88	20	0.1	517	507	2
2089	299	397	10	4	NA	4	5	1	5	4	1	NA	5	NA	1	88	20	0.4	517	507	2
2089	299	398	10	4	NA	3	7	1	5	4	1	NA	3	NA	1	88	15	0.2	517	507	2
2089	299	399	10	4	NA	1	2	1	1	3	1	2	7	3	3	88	20	0.8	517	507	2
2089	299	400	10	4	NA	2	7	1	1	3	1	2	2	3	3	88	15	0.2	517	507	2
2089	299	401	10	4	NA	2	7	1	4	4	1	NA	7	NA	2	88	20	0.5	517	507	2
2089	299	402	10	4	NA	1	2	1	5	4	2	NA	6	NA	3	88	30	1.9	517	507	2
2089	299	403	10	4	NA	1	2	1	4	4	2	NA	9	NA	2	88	25	2.5	517	507	2

Table G.1 (cont'd)

2089	299	404	10	4	NA	4	3	1	3	3	2	0	4	3	2	88	45	11.2	517	507	2
2089	299	404	10	4	NA	4	3	1	3	3	2	0	4	3	2	88	45	11.2	517	507	2
2265	329	405	10	4	NA	1	7	1	5	4	2	NA	3	NA	1	88	20	0.5	517	507	3
2469	371	406	10	4	NA	12	9	1	5	4	1	NA	3	NA	1	88	20	0.9	517	507	4
2469	371	407	10	4	NA	7	4	1	5	4	3	NA	1	NA	1	88	20	0.7	517	507	4
2469	371	408	10	4	NA	12	5	1	5	4	1	NA	4	NA	1	88	30	0.9	517	507	4
2540	389	409	10	4	NA	7	4	90	9	5	1	NA	NA	NA	2	11	15	0.4	517	507	5
2692	413	410	10	4	NA	1	5	90	9	5	1	NA	NA	NA	2	11	20	2.3	517	507	6
3011	430	411	10	4	NA	7	4	90	9	5	1	NA	NA	NA	2	11	20	0.5	517	507	7
3011	430	412	10	4	NA	7	4	90	9	5	1	NA	NA	NA	2	11	15	0.6	517	507	7
3361	460	413	10	4	NA	4	3	1	3	3	1	1	9	3	2	4	30	2.6	517	507	8
3606	507	414	10	4	NA	1	7	1	1	3	2	0	5	3	3	88	20	0.6	517	507	9
3606	507	415	10	4	NA	1	2	1	5	4	1	NA	4	NA	1	88	30	1	517	507	9
3606	507	416	10	4	NA	4	3	1	3	3	1	1	5	3	2	88	20	0.3	517	507	9
3606	507	417	10	4	NA	1	2	1	1	3	1	2	4	3	2	88	20	1.1	517	507	9
3606	507	418	10	4	NA	1	2	1	1	3	2	0	8	3	3	88	20	0.1	517	507	9
3886	577	419	10	4	NA	1	9	90	9	5	1	NA	NA	NA	2	11	15	0.1	517	507	10 14
3886	577	420	10	4	NA	1	2	1	4	4	1	NA	2	NA	2	88	10	0.1	517	507	10 14
3886	577	421	10	4	NA	1	2	1	1	3	2	2	7	3	1	88	20	0.6	517	507	10 14
3886	577	422	10	4	NA	1	2	1	3	3	3	0	2	3	2	5	40	5.5	517	507	10 14
3680	542	423	10	4	NA	1	7	1	5	4	1	NA	9	NA	1	88	30	0.7	517	507	10
3680	542	424	10	4	NA	2	3	1	4	4	1	NA	5	NA	2	88	25	0.5	517	507	10
3680	542	425	10	4	NA	1	2	1	1	3	2	1	4	3	1	88	30	1.3	517	507	10
3680	542	426	10	4	NA	2	19	1	4	4	4	NA	0	NA	2	88	15	0.2	517	507	10
3680	542	427	10	4	NA	1	2	90	9	5	2	NA	NA	NA	2	11	20	0.4	517	507	10
3680	542	428	10	4	NA	1	2	90	9	5	1	NA	NA	NA	2	11	30	1.8	517	507	10
3680	542	429	10	4	NA	4	3	1	1	3	2	0	2	3	1	88	20	0.4	517	507	10
3680	542	430	10	4	NA	1	2	1	4	4	1	NA	4	NA	2	88	20	0.4	517	507	10
3680	542	431	10	4	NA	1	2	90	9	5	3	NA	NA	NA	2	11	25	0.8	517	507	10
3680	542	432	10	4	NA	2	7	1	1	3	2	0	6	3	3	88	25	0.9	517	507	10
3680	542	433	10	4	NA	1	2	1	3	3	1	3	5	3	2	88	20	0.6	517	507	10
3680	542	434	10	4	NA	1	2	1	4	4	2	NA	4	NA	2	4	25	2.6	517	507	10
3680	542	435	10	4	NA	1	2	1	3	3	2	2	6	3	2	88	30	0.8	517	507	10
3709	549	436	10	4	NA	7	4	1	1	3	3	0	2	3	1	88	25	1	517	507	11

Table G.1 (cont'd)

3709	549	437	10	4	NA	1	7	1	5	4	1	NA	4	NA	2	88	15	0.1	517	507	11
3709	549	438	10	4	NA	1	33	1	4	4	1	NA	6	NA	2	88	20	0.6	517	507	11
3709	549	439	10	4	NA	1	2	1	5	4	1	NA	6	NA	3	88	30	1.6	517	507	11
3709	549	440	10	4	NA	1	2	90	9	5	1	NA	NA	NA	2	11	20	0.5	517	507	11
3709	549	441	10	4	NA	1	2	1	5	4	1	NA	7	NA	1	88	25	1.1	517	507	11
3709	549	442	10	4	NA	4	3	1	1	1	2	0	6	2	3	88	35	3.8	517	507	11
3709	549	443	10	4	NA	1	2	1	1	3	1	2	6	3	3	88	25	1	517	507	11
3801	551	444	10	4	NA	2	19	1	3	3	1	2	6	3	2	88	20	0.5	517	507	12
3801	551	445	10	4	NA	1	2	90	9	5	1	NA	NA	NA	2	11	15	0.1	517	507	12
3801	551	446	10	4	NA	1	2	1	3	3	1	1	5	3	2	88	20	0.9	517	507	12
3801	551	447	10	4	NA	1	7	1	1	3	2	0	7	3	3	88	20	0.4	517	507	12
3801	551	448	10	4	NA	1	2	1	1	3	2	1	5	3	1	88	20	1.1	517	507	12
3801	551	449	10	4	NA	1	2	1	1	3	1	3	7	3	3	88	25	0.8	517	507	12
3801	551	450	10	4	NA	1	2	1	5	4	3	NA	2	NA	1	88	35	3.6	517	507	12
3801	551	451	10	4	NA	7	4	1	1	3	2	0	6	3	3	88	35	5.8	517	507	12
3826	564	452	10	4	NA	1	2	1	5	4	2	NA	4	NA	1	88	20	0.5	517	507	13
3826	564	453	10	4	NA	2	19	1	3	3	1	2	6	3	2	88	20	0.5	517	507	13
3826	564	454	10	4	NA	1	19	1	3	3	1	2	6	3	2	88	20	0.4	517	507	13
3760	531	455	1	NA	NA	1	2	1	1	3	1	2	5	3	3	88	25	0.6	507	537	1
3760	531	456	1	NA	NA	1	2	1	1	3	1	2	5	3	3	88	25	0.6	507	537	1
3760	531	457	1	NA	NA	2	19	1	1	3	1	3	6	2	3	88	15	0.2	507	537	1
3760	531	458	1	NA	NA	1	2	1	5	4	2	NA	6	NA	1	88	15	0.2	507	537	1
3760	531	459	1	NA	NA	1	2	1	4	4	1	NA	6	NA	2	88	20	0.3	507	537	1
3760	531	460	1	NA	NA	2	19	1	4	4	2	NA	7	NA	2	88	25	0.7	507	537	1
3760	531	461	1	NA	NA	2	19	1	5	4	2	NA	5	NA	1	88	20	0.2	507	537	1
3760	531	462	1	NA	NA	2	19	1	1	3	2	4	3	3	1	88	25	1.1	507	537	1
3760	531	463	1	NA	NA	3	9	1	5	4	1	NA	4	NA	1	88	25	1.3	507	537	1
3760	531	464	1	NA	NA	1	2	1	3	3	2	1	2	3	2	88	15	0.1	507	537	1
3760	531	465	1	NA	NA	2	19	1	1	3	1	2	7	2	3	88	20	0.3	507	537	1
3760	531	466	1	NA	NA	1	33	1	1	3	2	0	3	3	3	88	20	0.4	507	537	1
3760	531	467	1	NA	NA	1	2	1	5	4	1	NA	4	NA	1	88	20	0.3	507	537	1
3760	531	468	1	NA	NA	7	4	1	5	4	1	NA	4	NA	3	88	30	2.2	507	537	1
3760	531	469	1	NA	NA	1	15	1	1	3	4	0	0	3	3	88	20	0.2	507	537	1
3760	531	470	1	NA	NA	1	7	1	3	3	1	2	5	3	2	88	20	0.4	507	537	1

Table G.1 (cont'd)

3760	531	471	1	NA	NA	2	1	90	9	5	3	NA	NA	NA	2	11	20	0.7	507	537	1
3760	531	472	1	NA	NA	1	2	1	1	3	1	4	5	3	2	88	20	0.7	507	537	1
3760	531	473	1	NA	NA	1	2	1	3	3	1	2	6	3	1	88	20	0.3	507	537	1
3760	531	474	1	NA	NA	1	2	1	5	4	2	NA	5	NA	1	88	20	0.3	507	537	1
3760	531	475	1	NA	NA	1	2	1	4	4	2	NA	4	NA	2	88	20	0.3	507	537	1
3760	531	476	1	NA	NA	2	19	90	9	5	1	NA	NA	NA	2	11	20	0.5	507	537	1
3760	531	477	1	NA	NA	1	2	1	4	4	1	NA	4	NA	2	88	20	0.9	507	537	1
3760	531	478	1	NA	NA	1	2	1	4	4	1	NA	6	NA	2	88	25	1.2	507	537	1
3760	531	479	1	NA	NA	1	2	90	9	5	2	NA	NA	NA	2	11	20	0.6	507	537	1
3760	531	480	1	NA	NA	2	19	1	4	4	2	NA	2	NA	2	88	20	0.4	507	537	1
3760	531	481	1	NA	NA	1	2	1	3	3	1	4	6	3	2	88	25	0.9	507	537	1
3760	531	482	1	NA	NA	2	4	1	5	4	1	NA	4	NA	3	88	15	0.2	507	537	1
3760	531	483	1	NA	NA	7	4	1	4	4	1	NA	1	NA	2	88	15	0.3	507	537	1
3760	531	484	1	NA	NA	2	19	1	1	3	2	0	3	3	1	88	15	0.3	507	537	1
3760	531	485	1	NA	NA	1	2	1	4	4	2	NA	6	NA	2	88	25	1.1	507	537	1
3760	531	486	1	NA	NA	2	19	1	1	3	3	2	6	3	1	88	25	1.2	507	537	1
3760	531	487	1	NA	NA	2	19	1	5	4	2	NA	7	NA	1	88	25	0.9	507	537	1
3760	531	488	1	NA	NA	1	2	1	1	3	1	4	9	3	1	4	30	3.4	507	537	1
3760	531	489	1	NA	NA	1	2	90	9	5	1	NA	NA	NA	2	11	15	0.2	507	537	1
3760	531	490	1	NA	NA	1	2	1	3	3	1	5	9	2	2	4	25	1.5	507	537	1
3760	531	491	1	NA	NA	1	2	1	5	4	2	NA	5	NA	1	88	15	0.1	507	537	1
3760	531	492	1	NA	NA	2	19	1	1	3	1	3	7	3	1	88	30	1.4	507	537	1
3760	531	493	1	NA	NA	1	2	1	7	3	1	1	9	3	3	88	25	1.6	507	537	1
3760	531	494	1	NA	NA	1	2	1	5	4	3	NA	5	NA	3	88	20	1	507	537	1
3760	531	495	1	NA	NA	1	2	1	5	4	2	NA	5	NA	3	2	25	2.4	507	537	1
3760	531	496	1	NA	NA	1	2	90	9	5	1	NA	NA	NA	2	11	30	1.7	507	537	1
3760	531	497	1	NA	NA	1	2	1	4	4	1	NA	6	NA	2	88	25	1.5	507	537	1
3760	531	498	1	NA	NA	1	2	1	3	3	3	0	3	2	2	88	35	3.7	507	537	1
3692	533	499	1	NA	NA	1	2	1	5	4	1	NA	3	NA	3	88	15	0.1	507	541	1
3692	533	500	1	NA	NA	1	4	1	3	3	2	0	2	3	2	88	15	0.1	507	541	1
3692	533	501	1	NA	NA	12	7	1	5	4	1	NA	1	NA	1	88	20	0.2	507	541	1
3692	533	502	1	NA	NA	3	9	1	3	3	1	2	3	2	2	88	25	0.7	507	541	1
3692	533	503	1	NA	NA	2	19	1	5	4	1	NA	5	NA	1	88	15	0.2	507	541	1
3692	533	504	1	NA	NA	1	2	1	1	3	1	2	6	3	3	88	20	0.3	507	541	1

Table G.1 (cont'd)

3692	533	505	1	NA	NA	2	19	1	1	3	2	1	6	3	1	88	15	0.1	507	541	1
3692	533	506	1	NA	NA	1	5	1	4	4	1	NA	6	NA	2	88	20	0.4	507	541	1
3692	533	507	1	NA	NA	1	2	90	9	5	1	NA	NA	NA	2	11	15	0.5	507	541	1
3692	533	508	1	NA	NA	1	2	1	1	3	2	0	3	3	3	88	15	0.3	507	541	1
3692	533	509	1	NA	NA	2	19	1	3	3	2	1	9	2	2	88	15	0.2	507	541	1
3692	533	510	1	NA	NA	1	15	1	3	3	1	1	6	3	2	88	20	0.3	507	541	1
3692	533	511	1	NA	NA	4	3	1	5	4	2	NA	3	NA	1	88	20	0.4	507	541	1
3692	533	512	1	NA	NA	1	2	1	5	4	1	NA	5	NA	1	88	15	0.1	507	541	1
3692	533	513	1	NA	NA	1	2	1	1	3	2	1	7	3	1	88	20	0.4	507	541	1
3692	533	514	1	NA	NA	1	2	1	3	3	1	1	4	3	2	88	20	0.2	507	541	1
3692	533	515	1	NA	NA	1	2	1	4	4	1	NA	2	NA	2	88	20	0.2	507	541	1
3692	533	516	1	NA	NA	3	6	1	5	4	1	NA	2	NA	1	88	15	0.1	507	541	1
3692	533	517	1	NA	NA	3	9	1	5	4	2	NA	3	NA	1	88	25	2	507	541	1
3692	533	518	1	NA	NA	1	5	1	5	4	1	NA	3	NA	3	88	20	0.3	507	541	1
3692	533	519	1	NA	NA	2	19	1	5	4	3	NA	5	NA	3	88	20	0.5	507	541	1
3692	533	520	1	NA	NA	1	2	1	1	3	2	2	3	2	3	88	20	0.1	507	541	1
3692	533	521	1	NA	NA	1	12	1	1	3	1	1	5	3	3	88	20	0.3	507	541	1
3692	533	522	1	NA	NA	1	2	1	5	4	1	NA	5	NA	1	88	15	0.1	507	541	1
3692	533	523	1	NA	NA	1	2	1	4	4	2	NA	6	NA	2	88	20	1.1	507	541	1
3692	533	524	1	NA	NA	1	2	1	3	3	2	1	4	3	2	88	20	0.4	507	541	1
3692	533	525	1	NA	NA	4	4	1	5	4	2	NA	3	NA	1	88	30	1.8	507	541	1
3692	533	526	1	NA	NA	1	2	90	9	5	1	NA	NA	NA	2	11	30	0.2	507	541	1
3692	533	527	1	NA	NA	1	2	1	5	4	1	NA	5	NA	1	88	20	0.3	507	541	1
3692	533	528	1	NA	NA	1	2	1	4	4	1	NA	5	NA	2	88	20	0.6	507	541	1
3692	533	529	1	NA	NA	1	2	1	5	4	3	NA	2	NA	1	88	20	0.3	507	541	1
3692	533	530	1	NA	NA	1	2	1	5	4	1	NA	3	NA	1	88	15	0.3	507	541	1
3692	533	531	1	NA	NA	2	19	1	4	4	1	NA	2	NA	2	88	15	0.1	507	541	1
3692	533	532	1	NA	NA	1	2	1	4	4	1	NA	7	NA	2	4	30	1.3	507	541	1
3692	533	533	1	NA	NA	1	2	1	4	4	2	NA	3	NA	2	88	20	0.6	507	541	1
3692	533	534	1	NA	NA	1	2	1	4	4	3	NA	1	NA	2	88	20	0.6	507	541	1
3692	533	535	1	NA	NA	1	2	1	1	3	2	2	9	2	1	88	25	1.1	507	541	1
3692	533	536	1	NA	NA	2	19	1	5	4	3	NA	2	NA	1	88	25	1.1	507	541	1
3692	533	537	1	NA	NA	4	3	1	5	4	1	NA	3	NA	1	88	20	0.3	507	541	1
3692	533	538	1	NA	NA	4	3	1	1	3	2	2	7	3	1	88	45	10.5	507	541	1

Table G.1 (cont'd)

3692	533	539	1	NA	NA	1	2	1	5	4	1	4	7	NA	1	5	35	4.5	507	541	1
3692	533	540	1	NA	NA	1	2	1	1	3	2	3	3	3	3	88	25	1.1	507	541	1
3692	533	541	1	NA	NA	1	2	1	5	4	1	NA	6	NA	1	4	25	1.9	507	541	1

Table G.1 (cont'd)

Bag	Lot	Art.	Pv.	St.	Ft.	R.M.	Cl.	AT.	Con.	FTO	Cr.	PS	DS	In.	Ter.	FTN	LD	W	E	N	L
2828	435	542	6	NA	NA	4	3	1	5	4	2	NA	4	NA	1	88	20	0.6	SWM	TU-IS	0
2828	435	543	6	NA	NA	1	2	1	4	4	1	NA	6	NA	2	88	25	0.8	SWM	TU-IS	0
2828	435	544	6	NA	NA	4	3	1	5	4	2	NA	9	NA	1	88	45	4.6	SWM	TU-IS	0
2828	435	545	6	NA	NA	1	2	1	3	3	2	0	6	3	2	88	20	0.3	SWM	TU-IS	0
2893	435	546	6	NA	NA	1	2	1	4	4	2	NA	4	NA	2	88	20	0.3	SWM	TU-IS	1
2893	435	547	6	NA	NA	1	2	1	5	4	1	NA	6	NA	3	88	20	0.5	SWM	TU-IS	1
2893	435	548	6	NA	NA	1	4	1	1	3	2	3	7	3	1	88	20	0.2	SWM	TU-IS	1
2893	435	549	6	NA	NA	2	1	1	7	3	1	2	1	3	1	88	15	0.2	SWM	TU-IS	1
2893	435	550	6	NA	NA	1	2	1	1	3	2	2	9	3	1	88	25	1.2	SWM	TU-IS	1
2893	435	551	6	NA	NA	1	8	1	1	3	2	0	2	3	3	88	20	0.3	SWM	TU-IS	1
2893	435	552	6	NA	NA	1	19	1	4	4	2	NA	6	NA	2	88	15	0.3	SWM	TU-IS	1
2893	435	553	6	NA	NA	1	2	1	1	3	2	2	6	3	1	88	20	0.4	SWM	TU-IS	1
2893	435	554	6	NA	NA	1	2	1	1	3	2	1	6	3	1	88	25	0.6	SWM	TU-IS	1
2893	435	555	6	NA	NA	1	2	1	5	4	3	NA	2	NA	1	88	30	2.1	SWM	TU-IS	1
2893	435	556	6	NA	NA	1	2	1	5	4	1	NA	7	NA	1	88	25	1	SWM	TU-IS	1
2893	435	557	6	NA	NA	1	2	1	5	4	1	NA	7	NA	1	88	20	0.3	SWM	TU-IS	1
3019	452	558	6	NA	NA	2	1	90	9	5	2	NA	NA	NA	2	11	20	1.1	SWM	TU-IS	2
3019	452	559	6	NA	NA	1	2	1	5	4	1	NA	8	NA	1	88	20	0.5	SWM	TU-IS	2
3019	452	560	6	NA	NA	2	19	1	4	4	1	NA	2	NA	2	88	20	0.3	SWM	TU-IS	2
3019	452	561	6	NA	NA	1	2	1	4	4	2	NA	5	NA	2	4	30	3.5	SWM	TU-IS	2
3019	452	562	6	NA	NA	1	33	1	1	3	1	2	9	3	1	4	30	2.7	SWM	TU-IS	2
3019	452	563	6	NA	NA	1	2	1	5	4	4	NA	0	NA	1	88	25	1	SWM	TU-IS	2
3019	452	564	6	NA	NA	1	2	1	5	4	2	NA	6	NA	1	88	20	0.8	SWM	TU-IS	2
3019	452	565	6	NA	NA	3	19	1	5	4	1	NA	6	NA	1	88	20	0.6	SWM	TU-IS	2
3019	452	566	6	NA	NA	1	2	1	5	4	3	NA	3	NA	1	88	20	0.3	SWM	TU-IS	2
3019	452	567	6	NA	NA	1	2	90	9	5	2	NA	NA	NA	2	11	15	0.5	SWM	TU-IS	2
3019	452	568	6	NA	NA	1	2	1	1	3	1	9	9	3	1	5	25	2.7	SWM	TU-IS	2
3019	452	569	6	NA	NA	1	2	1	5	4	4	NA	0	NA	1	88	25	2.3	SWM	TU-IS	2

Table G.1 (cont'd)

3019	452	570	6	NA	NA	7	4	1	5	4	1	NA	3	NA	1	88	35	1.5	SWM	TU-IS	2
3019	452	571	6	NA	NA	7	4	1	4	4	1	NA	3	NA	2	88	20	0.3	SWM	TU-IS	2
3019	452	572	6	NA	NA	7	4	1	1	3	1	2	7	3	3	4	25	1.1	SWM	TU-IS	2
2833	436	573	6	NA	NA	12	12	1	5	4	1	NA	6	NA	1	88	20	0.3	SWM	TU-IN	0
2833	436	574	6	NA	NA	2	19	1	4	4	3	NA	3	NA	2	88	20	0.4	SWM	TU-IN	0
2833	436	575	6	NA	NA	4	3	1	1	3	2	2	8	3	1	4	35	4.8	SWM	TU-IN	0
2833	436	576	6	NA	NA	1	2	1	4	4	1	NA	4	NA	2	88	25	0.8	SWM	TU-IN	0
2900	438	577	6	NA	NA	1	4	90	9	5	1	NA	NA	NA	2	11	15	0.7	SWM	TU-IN	1
2900	438	578	6	NA	NA	1	2	1	4	4	1	NA	6	NA	2	88	25	0.8	SWM	TU-IN	1
2900	438	579	6	NA	NA	2	4	1	5	4	2	NA	7	NA	21	88	25	0.7	SWM	TU-IN	1
2900	438	580	6	NA	NA	6	7	1	5	4	1	NA	3	NA	1	88	15	0.1	SWM	TU-IN	1
2900	438	581	6	NA	NA	1	2	1	5	4	1	NA	7	NA	1	88	15	0.3	SWM	TU-IN	1
2900	438	582	6	NA	NA	1	2	90	9	5	1	NA	NA	NA	2	11	15	0.5	SWM	TU-IN	1
2900	438	583	6	NA	NA	1	2	1	4	4	1	NA	5	NA	2	88	20	0.3	SWM	TU-IN	1
2900	438	584	6	NA	NA	1	2	1	5	4	1	NA	6	NA	1	88	25	0.7	SWM	TU-IN	1
2900	438	585	6	NA	NA	1	2	1	5	4	1	NA	6	NA	3	88	20	0.6	SWM	TU-IN	1
2900	438	586	6	NA	NA	1	2	1	4	4	1	NA	5	NA	2	88	15	0.1	SWM	TU-IN	1
2900	438	587	6	NA	NA	1	2	1	4	4	1	NA	3	NA	2	88	15	0.1	SWM	TU-IN	1
2900	438	588	6	NA	NA	1	2	1	1	3	2	0	2	3	2	88	15	0.2	SWM	TU-IN	1
2900	438	589	6	NA	NA	1	2	1	5	4	1	NA	6	NA	1	88	25	0.9	SWM	TU-IN	1
2900	438	590	6	NA	NA	4	3	1	3	3	1	0	7	3	2	4	60	15.7	SWM	TU-IN	1
2900	438	591	6	NA	NA	4	3	1	3	3	2	1	3	3	2	88	25	0.8	SWM	TU-IN	1
3078	453	592	6	NA	NA	1	2	1	1	3	2	2	5	3	3	88	20	0.8	SWM	TU-IN	2
3078	453	593	6	NA	NA	2	19	1	5	4	1	NA	7	NA	1	88	25	0.7	SWM	TU-IN	2
3078	453	594	6	NA	NA	1	2	1	1	3	2	0	4	3	1	88	25	0.9	SWM	TU-IN	2
3078	453	595	6	NA	NA	2	19	1	1	3	2	3	5	3	3	88	25	0.3	SWM	TU-IN	2
3078	453	596	6	NA	NA	3	4	1	1	3	1	3	3	3	1	88	20	0.3	SWM	TU-IN	2
3078	453	597	6	NA	NA	1	2	1	1	3	3	1	3	1	1	88	30	0.9	SWM	TU-IN	2
3078	453	598	6	NA	NA	1	4	1	5	4	1	NA	3	NA	1	88	20	0.3	SWM	TU-IN	2
3078	453	599	6	NA	NA	1	3	1	4	4	1	NA	4	NA	2	88	25	1.2	SWM	TU-IN	2
3078	453	600	6	NA	NA	1	2	1	5	4	2	NA	7	NA	1	88	20	0.7	SWM	TU-IN	2
3078	453	601	6	NA	NA	1	2	1	5	4	1	NA	5	NA	1	88	15	0.3	SWM	TU-IN	2
3078	453	602	6	NA	NA	4	3	1	5	4	1	NA	5	NA	1	88	15	0.3	SWM	TU-IN	2
3078	453	603	6	NA	NA	4	3	1	5	4	2	NA	4	NA	1	88	20	0.4	SWM	TU-IN	2

Table G.1 (cont'd)

3078	453	604	6	NA	NA	2	19	1	3	3	3	0	3	1	2	88	20	0.4	SWM	TU-1N	2
3078	453	605	6	NA	NA	1	2	1	1	3	1	2	9	3	4	4	25	1.4	SWM	TU-1N	2
3078	453	606	6	NA	NA	1	2	1	5	4	2	NA	3	NA	1	88	25	1	SWM	TU-1N	2
3078	453	607	6	NA	NA	4	3	1	1	3	3	0	3	3	3	88	45	12.7	SWM	TU-1N	2
3510	515	608	6	NA	NA	1	2	1	5	4	3	NA	4	NA	1	88	20	1.3	SWM	TU-1N	2
3510	515	609	6	NA	NA	2	19	1	5	4	1	NA	6	NA	1	88	25	0.6	SWM	TU-1N	2
3510	515	610	6	NA	NA	1	4	90	9	5	1	NA	NA	NA	2	11	25	2.4	SWM	TU-1N	2
3195	489	611	5	NA	NA	1	2	1	4	4	1	NA	5	NA	2	88	25	0.9	NWM	TU-6N	0
3195	489	612	5	NA	NA	15	1	1	5	4	1	NA	3	NA	1	88	20	1	NWM	TU-6N	0
3300	491	613	5	NA	NA	1	2	1	5	4	1	NA	6	NA	1	88	25	0.8	NWM	TU-6N	1
3300	491	614	5	NA	NA	1	7	1	3	3	1	2	7	3	2	88	20	0.7	NWM	TU-6N	1
3300	491	615	5	NA	NA	1	2	1	3	3	1	2	4	3	2	88	20	0.5	NWM	TU-6N	1
3300	491	616	5	NA	NA	2	19	1	4	4	2	NA	5	NA	2	88	25	1.9	NWM	TU-6N	1
3300	491	617	5	NA	NA	1	2	1	1	3	1	2	6	3	1	88	15	0.1	NWM	TU-6N	1
3300	491	618	5	NA	NA	1	2	1	4	4	1	NA	3	NA	2	88	20	0.4	NWM	TU-6N	1
3300	491	619	5	NA	NA	1	2	1	1	3	1	4	4	3	1	88	20	1	NWM	TU-6N	1
3300	491	620	5	NA	NA	1	2	1	3	3	1	2	4	3	2	88	20	0.5	NWM	TU-6N	1
3300	491	621	5	NA	NA	1	2	1	5	4	1	NA	3	NA	1	88	20	0.3	NWM	TU-6N	1
3300	491	622	5	NA	NA	1	2	1	5	4	1	NA	4	NA	1	88	20	0.5	NWM	TU-6N	1
3300	491	623	5	NA	NA	1	2	1	5	4	2	NA	3	NA	1	88	20	0.4	NWM	TU-6N	1
3300	491	624	5	NA	NA	1	2	1	5	4	2	NA	6	NA	1	88	25	0.8	NWM	TU-6N	1
3300	491	625	5	NA	NA	6	7	1	4	4	2	NA	3	NA	1	88	25	1.6	NWM	TU-6N	1
3300	491	626	5	NA	NA	3	7	1	5	4	1	NA	3	NA	3	88	20	0.2	NWM	TU-6N	1
3300	491	627	5	NA	NA	1	2	90	9	5	1	NA	NA	NA	2	11	15	0.2	NWM	TU-6N	1
3300	491	628	5	NA	NA	1	2	1	5	4	1	NA	6	NA	1	88	20	0.4	NWM	TU-6N	1
3300	491	629	5	NA	NA	1	2	1	5	4	2	NA	3	NA	3	88	30	1.2	NWM	TU-6N	1
3300	491	630	5	NA	NA	1	4	1	5	4	2	NA	5	NA	1	88	20	0.6	NWM	TU-6N	1
3300	491	631	5	NA	NA	2	19	90	9	5	1	NA	NA	NA	2	11	20	1	NWM	TU-6N	1
3300	491	632	5	NA	NA	1	2	1	5	4	3	NA	2	NA	3	88	20	0.4	NWM	TU-6N	1
3300	491	633	5	NA	NA	1	2	1	1	3	3	2	4	3	1	88	35	5.2	NWM	TU-6N	1
3300	491	634	5	NA	NA	1	7	1	4	4	1	NA	7	NA	2	88	20	0.9	NWM	TU-6N	1
3300	491	635	5	NA	NA	1	2	1	4	4	2	NA	3	NA	2	88	15	0.4	NWM	TU-6N	1
3300	491	636	5	NA	NA	1	2	1	4	4	3	NA	4	NA	2	88	20	0.6	NWM	TU-6N	1
3300	491	637	5	NA	NA	1	2	1	5	4	2	NA	5	NA	3	11	25	1.3	NWM	TU-6N	1

Table G.1 (cont'd)

3300	491	638	5	NA	NA	1	2	1	5	4	2	NA	5	NA	1	88	25	1.5	NWM	TU-6N	1
3300	491	639	5	NA	NA	1	2	1	5	4	2	NA	3	NA	1	88	20	0.5	NWM	TU-6N	1
3300	491	640	5	NA	NA	1	2	1	4	4	2	NA	3	NA	2	88	25	1.8	NWM	TU-6N	1
3300	491	641	5	NA	NA	1	2	1	1	3	2	3	8	3	1	88	25	1	NWM	TU-6N	1
3300	491	642	5	NA	NA	1	2	1	5	4	2	NA	8	NA	3	88	25	1.3	NWM	TU-6N	1
3455	500	643	5	NA	NA	1	2	1	5	4	1	NA	4	NA	3	88	20	0.4	NWM	TU-6N	2
3455	500	644	5	NA	NA	1	2	1	3	3	1	3	4	3	2	88	20	0.7	NWM	TU-6N	2
3455	500	645	5	NA	NA	1	2	1	5	4	1	NA	2	NA	3	88	20	0.5	NWM	TU-6N	2
3455	500	646	5	NA	NA	1	2	1	1	3	3	3	2	3	1	88	25	1.6	NWM	TU-6N	2
3455	500	647	5	NA	NA	1	2	1	1	3	2	0	2	3	3	88	20	0.3	NWM	TU-6N	2
3455	500	648	5	NA	NA	1	2	1	1	3	3	1	3	3	1	88	20	0.6	NWM	TU-6N	2
3455	500	649	5	NA	NA	1	2	1	1	3	2	1	5	3	1	88	20	0.4	NWM	TU-6N	2
3455	500	650	5	NA	NA	1	2	1	3	3	2	2	6	3	2	88	20	0.4	NWM	TU-6N	2
3455	500	651	5	NA	NA	1	2	1	4	4	2	NA	9	NA	2	88	20	1.4	NWM	TU-6N	2
3455	500	652	5	NA	NA	1	2	1	1	3	2	0	5	3	1	88	15	0.2	NWM	TU-6N	2
3455	500	653	5	NA	NA	1	2	90	9	5	1	NA	NA	NA	2	11	15	0.7	NWM	TU-6N	2
3455	500	654	5	NA	NA	1	2	1	4	4	2	NA	4	NA	2	88	20	1.4	NWM	TU-6N	2
3455	500	655	5	NA	NA	1	33	1	1	3	2	3	6	2	1	5	25	2	NWM	TU-6N	2
3455	500	656	5	NA	NA	1	2	90	9	5	1	NA	NA	NA	2	11	20	0.4	NWM	TU-6N	2
3455	500	657	5	NA	NA	12	11	1	4	4	1	NA	4	NA	2	88	25	1	NWM	TU-6N	2
3455	500	658	5	NA	NA	6	7	1	1	3	1	1	4	3	1	88	25	1	NWM	TU-6N	2
3455	500	659	5	NA	NA	2	19	1	5	4	2	NA	9	NA	1	88	20	1.9	NWM	TU-6N	2
3455	500	660	5	NA	NA	1	2	1	5	4	1	NA	2	NA	3	88	30	1	NWM	TU-6N	2
3589	520	661	5	NA	NA	1	2	1	5	4	1	NA	4	NA	1	88	20	0.1	NWM	TU-6N	3
3589	520	662	5	NA	NA	1	3	1	4	4	1	NA	1	NA	2	88	20	0.1	NWM	TU-6N	3
3589	520	663	5	NA	NA	1	2	1	3	3	1	3	6	3	2	88	20	0.8	NWM	TU-6N	3
3589	520	664	5	NA	NA	3	19	1	3	3	2	2	5	3	2	88	25	0.9	NWM	TU-6N	3
3589	520	665	5	NA	NA	1	7	1	4	4	1	NA	3	NA	2	88	15	0.1	NWM	TU-6N	3
3589	520	666	5	NA	NA	1	2	1	1	3	2	0	6	3	1	88	20	0.9	NWM	TU-6N	3
3589	520	667	5	NA	NA	1	2	1	5	4	1	NA	4	NA	1	88	15	0.1	NWM	TU-6N	3
3589	520	668	5	NA	NA	1	2	1	4	4	1	NA	3	NA	2	88	15	0.1	NWM	TU-6N	3
3589	520	669	5	NA	NA	2	3	1	5	4	1	NA	6	NA	1	88	20	0.3	NWM	TU-6N	3
3589	520	670	5	NA	NA	1	2	1	3	3	2	2	5	3	2	88	20	0.4	NWM	TU-6N	3
3589	520	671	5	NA	NA	4	3	1	4	4	1	NA	3	NA	2	88	15	0.1	NWM	TU-6N	3

Table G.1 (cont'd)																					
3589	520	672	5	NA	NA	3	7	1	5	4	1	NA	4	NA	1	88	20	0.8	NWM	TU-6N	3
3589	520	673	5	NA	NA	1	2	1	1	3	1	2	2	3	1	88	15	0.2	NWM	TU-6N	3
3589	520	674	5	NA	NA	1	2	1	4	4	1	NA	5	NA	2	88	20	1	NWM	TU-6N	3
3589	520	675	5	NA	NA	1	7	1	5	4	1	NA	5	NA	1	88	25	0.8	NWM	TU-6N	3
3589	520	676	5	NA	NA	1	5	1	3	3	1	2	5	3	2	88	15	0.1	NWM	TU-6N	3
3589	520	677	5	NA	NA	1	2	1	5	4	1	NA	9	NA	1	88	20	1.1	NWM	TU-6N	3
3589	520	678	5	NA	NA	1	2	1	5	4	2	NA	6	NA	1	5	30	2.7	NWM	TU-6N	3
3589	520	679	5	NA	NA	15	2	1	1	3	1	1	9	3	1	88	20	0.4	NWM	TU-6N	3
2207	328	680	10	4	NA	2	19	1	3	3	2	2	4	3	2	88	25	0.6	516	506	3
2207	328	681	10	4	NA	1	5	1	1	3	1	1	4	3	1	88	15	0.1	516	506	3
2207	328	682	10	4	NA	1	2	1	1	3	2	2	9	3	1	88	30	2.5	516	506	3
2207	328	683	10	4	NA	4	3	1	3	3	1	3	4	3	2	4	25	2.4	516	506	3
2207	328	684	10	4	NA	1	7	1	1	3	1	2	5	3	1	88	15	0.2	516	506	3
2207	328	685	10	4	NA	1	7	1	1	3	1	1	4	3	1	88	10	0.1	516	506	3
2449	370	686	10	4	NA	1	7	1	5	4	2	NA	6	NA	1	88	15	0.1	516	506	4
2433	370	687	10	4	NA	1	2	90	9	5	3	NA	NA	NA	2	11	15	0.5	516	506	4
2433	370	688	10	4	NA	1	2	1	5	4	1	NA	6	NA	3	88	25	0.5	516	506	4
2433	370	689	10	4	NA	1	2	1	3	3	2	2	6	3	2	88	15	0.1	516	506	4
2433	370	690	10	4	NA	2	19	1	5	4	2	NA	3	NA	1	88	15	0.2	516	506	4
2433	370	691	10	4	NA	1	2	1	4	4	1	NA	6	NA	2	88	20	0.6	516	506	4
2433	370	692	10	4	NA	1	2	1	5	4	1	NA	5	NA	1	88	20	0.1	516	506	4
2433	370	693	10	4	NA	1	2	90	9	5	1	NA	NA	NA	2	11	15	0.2	516	506	4
2638	388	694	10	4	NA	1	2	1	1	3	2	4	7	3	3	88	30	3	516	506	5
2755	412	695	10	4	NA	7	4	1	3	3	1	1	4	2	2	88	25	1.1	516	506	6
2755	412	696	10	4	NA	1	2	1	1	3	1	2	9	3	1	4	25	2.8	516	506	6
2885	427	697	10	4	NA	1	2	90	9	5	1	NA	NA	NA	2	11	15	0.4	516	506	7
2885	427	698	10	4	NA	1	12	1	1	3	1	3	7	3	1	88	20	0.4	516	506	7
3065	459	699	10	4	NA	1	2	1	1	3	1	5	5	3	3	88	25	0.6	516	506	8
3065	459	700	10	4	NA	1	2	1	1	3	2	0	6	2	1	88	20	0.4	516	506	8
3065	459	701	10	4	NA	1	2	1	4	4	1	NA	4	NA	2	88	20	0.8	516	506	8
3065	459	702	10	4	NA	1	2	1	1	3	1	2	5	2	2	88	20	0.5	516	506	8
3065	459	703	10	4	NA	4	3	1	1	3	4	0	0	3	1	88	30	1.6	516	506	8
3065	459	704	10	4	NA	1	2	1	1	3	1	3	9	3	1	4	30	1.5	516	506	8
3657	506	705	10	4	NA	1	2	1	3	3	1	1	4	3	2	88	25	0.8	516	506	9 10

Table G.1 (cont'd)

3657	506	706	10	4	NA	1	2	1	5	4	3	NA	1	NA	1	88	20	0.4	516	506	9 10
3657	506	707	10	4	NA	1	2	1	5	4	1	NA	7	NA	1	88	25	0.8	516	506	9 10
3657	506	708	10	4	NA	2	19	1	5	4	1	NA	1	NA	1	88	15	0.1	516	506	9 10
3657	506	709	10	4	NA	3	9	1	4	4	1	NA	5	NA	2	88	25	0.7	516	506	9 10
3657	506	710	10	4	NA	1	2	1	4	4	1	NA	4	NA	2	88	25	0.9	516	506	9 10
3657	506	711	10	4	NA	1	2	1	5	4	1	NA	6	NA	1	88	15	0.1	516	506	9 10
3657	506	712	10	4	NA	1	2	1	4	4	1	NA	3	NA	2	88	20	0.2	516	506	9 10
3657	506	713	10	4	NA	1	2	1	5	4	2	NA	2	NA	1	88	15	0.1	516	506	9 10
3657	506	714	10	4	NA	1	7	1	5	4	3	NA	3	NA	1	88	20	0.2	516	506	9 10
3657	506	715	10	4	NA	4	3	1	5	4	2	NA	3	NA	1	88	20	0.5	516	506	9 10
3657	506	716	10	4	NA	1	2	1	4	4	1	NA	6	NA	2	88	20	0.5	516	506	9 10
3657	506	717	10	4	NA	1	2	1	4	4	3	NA	3	NA	2	88	25	1.7	516	506	9 10
3657	506	718	10	4	NA	1	2	1	1	3	2	1	5	2	1	88	20	0.4	516	506	9 10
3657	506	719	10	4	NA	4	3	1	3	3	4	1	2	3	2	88	60	20.6	516	506	9 10
3657	506	720	10	4	NA	1	2	90	9	5	2	NA	NA	NA	2	11	25	0.8	516	506	9 10
3657	506	721	10	4	NA	4	3	1	4	4	3	NA	1	NA	2	88	30	1.7	516	506	9 10
3657	506	722	10	4	NA	1	2	1	3	3	3	0	2	3	2	88	20	0.6	516	506	9 10
3894	574	723	10	4	NA	1	2	1	1	3	3	2	6	3	1	88	30	2.2	516	506	11
3894	574	724	10	4	NA	2	19	1	4	4	2	NA	7	NA	2	88	30	2.4	516	506	11
3894	574	725	10	4	NA	1	2	1	5	4	1	NA	4	NA	1	88	15	0.1	516	506	11
3894	574	726	10	4	NA	1	15	1	5	4	1	NA	4	NA	1	88	20	0.2	516	506	11
3894	574	727	10	4	NA	1	7	1	4	4	1	NA	7	NA	2	88	20	0.1	516	506	11
3894	574	728	10	4	NA	1	7	1	5	4	1	NA	5	NA	1	88	15	0.1	516	506	11
3894	574	729	10	4	NA	2	19	1	5	4	2	NA	3	NA	1	88	15	0.1	516	506	11
4039	584	730	10	4	NA	1	9	1	5	4	1	NA	4	NA	1	88	20	0.4	516	506	13
2900	438	731	6	NA	NA	8	30	1	1	3	1	4	2	3	1	88	20	0.4	SWM	TU-IN	1
2303	330	732	11	5	NA	1	3	1	4	4	1	NA	2	NA	2	88	15	0.1	521	536	3 4
2303	330	733	11	5	NA	8	30	1	1	3	1	2	3	3	1	88	15	0.1	521	536	3 4
3362	460	734	10	4	NA	8	1	1	1	3	1	1	4	3	3	88	20	0.3	517	507	8
3012	430	735	10	4	NA	8	31	1	1	3	2	1	8	3	3	88	25	0.9	517	507	7
3455	500	736	5	NA	NA	8	31	1	5	4	1	NA	6	NA	3	88	15	0.1	NWM	TU-6N	2
3695	533	737	1	NA	NA	8	31	1	5	4	1	NA	5	NA	1	88	15	0.1	507	541	1
3695	533	738	1	NA	NA	8	31	1	5	4	1	NA	3	NA	1	88	20	0.2	507	541	1
2893	435	739	6	NA	NA	8	30	1	5	4	1	NA	6	NA	1	88	15	0.1	SWM	TU-IS	1

Table G.1 (cont'd)																					
3020	452	740	6	NA	NA	8	30	1	5	4	1	NA	5	NA	3	88	15	0.4	SWM	TU-1S	2
3020	452	741	6	NA	NA	8	31	1	4	4	1	NA	2	NA	2	88	15	0.1	SWM	TU-1S	2
3020	452	742	6	NA	NA	8	31	1	5	4	1	NA	5	NA	2	1	15	0.1	SWM	TU-1S	2
1203	77	743	2	NA	NA	1	3	1	1	3	2	2	7	3	1	88	15	0.1	517	496	4
257	48	744	2	NA	NA	8	31	1	4	4	1	NA	6	NA	2	1	20	0.2	504	500	1
431	62	745	2	NA	NA	8	31	90	9	5	1	NA	NA	NA	2	11	15	0.1	504	500	2
1401	196	746	2	NA	NA	8	30	1	1	3	3	1	2	3	1	88	15	0.1	518	496	6
179	17	747	1	NA	NA	8	31	1	5	4	1	NA	5	NA	1	88	20	0.1	515	531	0
106	21	748	1	NA	NA	8	31	1	4	4	1	NA	4	NA	2	88	10	0.1	515	531	1
106	21	749	1	NA	NA	8	30	90	9	5	1	NA	NA	NA	2	88	15	0.2	515	531	1
106	21	750	1	NA	NA	8	30	1	5	4	3	NA	0	NA	1	88	15	0.2	515	531	1
106	21	751	1	NA	NA	8	31	1	3	3	1	3	6	3	2	88	20	0.4	515	531	1
1034	157	752	2	NA	NA	8	30	1	5	4	1	NA	8	NA	1	88	15	0.4	517	496	2
1203	77	753	2	NA	NA	8	31	1	4	4	1	NA	4	NA	2	3	20	0.2	517	496	4
1034	157	754	2	NA	NA	8	31	1	5	4	1	NA	2	NA	3	88	25	0.5	517	496	2
259	48	755	2	NA	NA	8	31	1	4	4	1	NA	3	NA	2	88	20	0.1	504	500	1
259	48	756	2	NA	NA	8	31	1	5	4	1	NA	1	NA	3	88	15	0.1	504	500	1
886	132	757	1	NA	NA	8	31	1	4	4	1	NA	4	NA	2	88	15	0.2	515	531	3
1279	190	758	2	NA	NA	8	30	1	4	4	1	NA	5	NA	2	88	20	0.3	517	496	5
1279	190	759	2	NA	NA	8	31	1	3	3	1	1	5	3	2	88	20	0.3	517	496	5
3305	468	760	5	NA	NA	1	2	1	4	4	2	NA	4	NA	2	88	20	0.4	NWM	TU-4N	0
3349	502	761	5	NA	NA	1	2	1	5	4	3	NA	6	NA	1	88	20	0.6	NWM	TU-4N	2

APPENDIX H

Table H.1: Pueblo de la Mesa Stone Tools (Variables 1 -19)

Bag#	Lot#	Art.#	Prov.	St.#	Ft.	R.M.	Col.	AT	Con.	FTO	Cor.	PS	DS	In.	Ter.	FTN	Len.	Wid.
3256	482	1	11	5	NA	1	2	3.6	1	3	3	1	7	3	1	4	5.46	3.47
3256	482	2	11	5	NA	2	1	2.1	1	2	1	2	8	3	1	2	3.4	2.1
3256	482	3	11	5	NA	2	19	2.9.1	1	3	1	5	9	3	1	4	2.79	1.83
2299	330	4	11	5	NA	1	2	3.8.1	5	2	3	NA	9	NA	1	2	2.71	1.76
2299	330	5	11	5	NA	1	2	2.1	5	4	2	NA	6	NA	1	88	2.33	1
2299	330	6	11	5	NA	1	2	2.2	5	4	3	NA	9	NA	1	4	2.12	1.51
2299	330	7	11	5	NA	1	2	3.2	3	3	3	1	9	3	NA	88	1.91	1.32
1956	301	8	11	5	NA	1	2	4	1	3	1	2	9	3	1	4	3.63	2.2
1956	301	9	11	5	NA	1	2	20	5	4	1	NA	7	NA	1	88	2.2	1.27
1956	301	10	11	5	NA	1	7	7.4	7	NA	1	NA	NA	NA	NA	NA	2.22	1.05
1956	301	11	11	5	NA	1	17	10.3	1	NA	1	NA	NA	NA	NA	NA	1.98	1.55
3205	485	12	11	5	1	1	2	7.4	2	NA	1	NA	NA	NA	NA	NA	1.58	0.95
3205	485	13	11	5	NA	1	2	10.1	1	NA	2	NA	NA	NA	NA	NA	3.55	2.51
3205	485	14	11	5	NA	1	2	10.1	1	NA	2	NA	NA	NA	NA	NA	2.55	2.1
3428	498	15	11	5	NA	1	2	2.4	1	3	1	1	9	3	3	3	3.15	1.45
3428	498	16	11	5	NA	1	2	7.3	2	NA	2	NA	NA	NA	NA	NA	1.75	1.39
3428	498	17	11	5	NA	1	2	3.4	5	4	1	NA	9	NA	1	88	1.85	1.25
3428	498	18	11	5	NA	1	2	2.1	1	3	1	2	6	3	3	88	1.64	1.32
3428	498	19	11	5	NA	1	2	2.6.1	5	4	1	NA	7	NA	3	88	2.3	1.23
3428	498	20	11	5	NA	1	7	7.4	3	NA	1	NA	NA	NA	NA	NA	1.2	1
3428	498	21	11	5	NA	1	2	7.1	5	NA	1	NA	NA	NA	NA	NA	2.83	2.5
3428	498	22	11	5	NA	1	2	2.4.1	1	3	1	2	6	3	3	4	3.05	2.35
3428	498	23	11	5	NA	1	3	2.3	5	4	1	NA	5	NA	3	88	1.49	1.38
3428	498	24	11	5	NA	12	3	3.2	1	3	2	1	7	3	1	4	6.03	3.49
3428	498	25	11	5	NA	1	2	10.1	1	NA	2	NA	NA	NA	NA	NA	2.23	1.8
3428	498	26	11	5	NA	1	5	3.8.1	1	3	1	3	9	3	3	5	2.12	1.8
3078	453	27	6	NA	NA	2	19	2.1	5	4	1	NA	6	NA	1	88	1.9	1
3078	453	28	6	NA	NA	7	4	20	3	3	1	4	9	3	2	4	3.31	3.09
3078	453	29	6	NA	NA	1	2	2.4.1	1	1	2	2	5	2	1	1	2.08	1.64
3078	453	30	6	NA	NA	1	3	7.5	4	NA	1	NA	NA	NA	NA	NA	0.83	1.27

Table H.1.1 (cont'd)

3078	453	31	6	NA	NA	1	2	6	1	NA	3	NA	9	NA	NA	NA	3.59	2.7
2900	438	32	6	NA	NA	2	19	3.2	5	4	1	NA	8	NA	3	8	1.3	1.2
3455	500	33	5	NA	NA	2	19	10.3	1	NA	2	NA	NA	NA	NA	NA	1.98	1.4
3455	500	34	5	NA	NA	1	2	10.1	1	NA	4	NA	NA	NA	NA	NA	2.43	1.8
3455	500	35	5	NA	NA	1	2	20	13	4	3	5	3	1	88	2.48	2.38	0.85
3300	491	36	5	NA	NA	1	2	3.7.1	1	3	2	4	9	3	1	4	2.48	1.43
3300	491	37	5	NA	NA	1	2	6	1	3	2	0	9	2	1	88	1.45	1.75
3300	491	38	5	NA	NA	1	2	10.3	1	NA	2	NA	NA	NA	NA	NA	1.45	1.25
3300	491	39	5	NA	NA	1	2	10.3	1	NA	2	NA	NA	NA	NA	NA	2.07	1.42
3300	491	40	5	NA	NA	1	2	10.3	1	NA	2	NA	NA	NA	NA	NA	2.9	1.58
3300	491	41	5	NA	NA	1	2	10.3	1	NA	2	NA	NA	NA	NA	NA	1.95	1.43
3589	520	42	5	NA	NA	1	2	10.3	1	NA	1	NA	NA	NA	NA	NA	1.8	1.1
3589	520	43	5	NA	NA	1	2	3.9.1	5	4	1	NA	7	NA	3	88	1.95	1.64
3680	542	44	10	4	NA	2	19	2.2	5	4	3	NA	4	NA	3	88	2.25	1.99
3680	542	45	10	4	NA	1	2	3.5	5	4	1	NA	4	NA	1	88	1.63	1.54
3680	542	46	10	4	NA	2	15	7.2	3	NA	2	NA	NA	NA	NA	NA	3.05	2.65
3680	542	47	10	4	NA	1	7	10.1	1	NA	3	NA	NA	NA	NA	NA	2.47	1.92
3826	564	48	10	4	NA	1	2	3.2	5	4	1	NA	7	NA	1	88	1.81	1.7
3826	564	49	10	4	NA	2	19	10.3	1	NA	2	NA	NA	NA	NA	NA	2	1.45
3826	564	50	10	4	NA	1	2	2.4.1	1	3	2	3	8	3	1	4	2.67	1.91
3361	460	51	10	4	NA	7	3	10.1	1	NA	2	NA	NA	NA	NA	NA	4.37	3.7
3361	460	52	10	4	NA	1	2	2.5.1	1	3	3	2	9	3	1	4	2	1.39
3011	430	53	10	4	NA	4	3	10.1	1	NA	2	NA	NA	NA	NA	NA	6.39	4.22
3019	452	54	6	NA	NA	1	2	10.3	1	NA	3	NA	NA	NA	NA	NA	2.46	1.72
3019	452	55	6	NA	NA	1	2	5	5	4	2	NA	9	NA	1	88	2.54	1.92
3019	452	56	6	NA	NA	1	2	10.1	1	NA	3	NA	NA	NA	NA	NA	3.04	2.71
3019	452	57	6	NA	NA	2	19	3.2	3	3	2	3	2	3	2	88	1.4	1.08
3019	452	58	6	NA	NA	2	19	5	4	4	1	NA	9	NA	NA	88	2.26	1.63
2828	435	59	6	NA	NA	1	2	10.1	1	NA	2	NA	NA	NA	NA	NA	2.65	1.71
2893	435	60	6	NA	NA	1	2	10.1	1	NA	2	NA	NA	NA	NA	NA	2.5	1.54
3091	463	61	6	NA	NA	1	2	2.2	4	4	2	NA	1	NA	2	88	2.3	1.78
3091	463	62	6	NA	NA	1	19	10.1	1	NA	1	NA	NA	NA	NA	NA	3.33	2.38
3760	531	63	1	NA	NA	12	6	4	4	4	1	NA	3	NA	NA	88	3.28	2.64
3760	531	64	1	NA	NA	1	2	3.5.1	5	3	2	NA	9	NA	1	4	1.93	1.76

Table H.1 (cont'd)

3760	531	65	1	NA	NA	NA	1	2	2.5	1	3	2	4	9	3	1	4	2.41	1.84
3760	531	66	1	NA	NA	NA	1	2	10.1	1	NA	3	NA	NA	NA	NA	NA	2.37	1.8
3760	531	67	1	NA	NA	NA	2	19	7.2	1	3	1	3	9	3	1	5	2.29	1.25
3760	531	68	1	NA	NA	NA	1	2	6	5	4	1	NA	9	NA	1	88	1.77	1.46
3760	531	69	1	NA	NA	NA	1	2	3.6	1	3	1	1	9	3	1	4	2.32	1.6
3760	531	70	1	NA	NA	NA	1	2	7.2	4	NA	1	NA	NA	NA	NA	NA	1.67	1.33
3760	531	71	1	NA	NA	NA	2	3	2.7.1	1	3	1	6	9	3	1	4	2.61	1.84
3760	531	72	1	NA	NA	NA	1	2	10.1	1	NA	3	NA	NA	NA	NA	NA	4.14	2.55
3760	531	73	1	NA	NA	NA	1	7	2.1	3	3	1	3	1	3	NA	88	2.23	1.35
3760	531	74	1	NA	NA	NA	2	7	7.1	1	NA	3	NA	NA	NA	NA	NA	2.85	1.98
3760	531	75	1	NA	NA	NA	1	2	20	5	4	2	NA	9	NA	3	4	3.65	2.73
3692	533	76	1	NA	NA	NA	1	2	10.1	1	NA	2	NA	NA	NA	NA	NA	1.76	1.25
3692	533	77	1	NA	NA	NA	1	2	20	5	3	2	NA	7	NA	1	4	2.48	1.18
3692	533	78	1	NA	NA	NA	1	2	3.5.1	5	3	1	NA	9	NA	1	88	2.15	2
3692	533	79	1	NA	NA	NA	2	19	10.3	1	NA	4	NA	NA	NA	NA	NA	1.87	1.08
3692	533	80	1	NA	NA	NA	1	5	7.3	1	NA	1	NA	NA	NA	NA	NA	2.1	1.6
3692	5333	81	1	NA	NA	NA	1	2	10.1	1	NA	3	NA	NA	NA	NA	NA	4.27	3.6
3692	533	82	1	NA	NA	NA	1	2	10.3	1	NA	2	NA	NA	NA	NA	NA	1.96	1.73
3692	533	83	1	NA	NA	NA	2	19	2.1	1	3	2	2	5	3	3	5	2.07	1.42
3657	506	84	10	4	NA	NA	1	2	2.1	1	3	2	2	5	3	1	4	2.87	2.1
3657	506	85	10	4	NA	NA	1	2	13	5	4	2	NA	5	NA	3	4	2.27	2.02
3657	506	86	10	4	NA	NA	1	2	2.2	1	3	2	1	5	2	1	4	1.87	1.87
3657	506	87	10	4	NA	NA	1	2	10.3	1	NA	2	NA	NA	NA	NA	NA	1.92	1.22
3657	506	88	10	4	NA	NA	1	2	2.1	5	4	1	NA	7	NA	1	4	2.48	1.61
3657	506	89	10	4	NA	NA	1	20	3.1	1	3	1	2	9	2	3	88	1.83	1.22
3657	506	90	10	4	NA	NA	1	2	10.1	1	NA	3	NA	NA	NA	NA	NA	3.01	1.68
3657	506	91	10	4	NA	NA	1	2	10.3	1	NA	2	NA	NA	NA	NA	NA	1.68	1.23
3657	506	92	10	4	NA	NA	1	2	3.4	5	4	1	NA	6	NA	1	4	2.2	1.9
3657	506	93	10	4	NA	NA	1	2	3.1	5	4	2	NA	7	NA	1	88	1.9	1.46
2207	328	94	10	4	NA	NA	1	2	7.3	4	NA	1	NA	NA	NA	NA	NA	1.04	0.9
2755	412	95	10	4	NA	NA	1	2	5	1	3	1	1	9	3	1	4	3.03	1.74
2755	412	96	10	4	NA	NA	1	2	3.6.1	1	3	2	3	5	3	1	5	2.76	2.3
2755	412	97	10	4	NA	NA	1	2	2.1	4	4	3	NA	8	NA	2	4	2.56	1.9
2638	388	98	10	4	NA	NA	1	2	2.1	1	3	2	6	7	3	1	5	3.95	2.2

Table H.1 (cont'd)

Table H.1 (cont'd)																			
2433	370	99	10	4	NA	1	2	10.3	1	NA	3	NA	NA	NA	NA	NA	NA	1.95	1.63
3894	574	100	10	4	NA	1	2	10.1	1	NA	2	NA	NA	NA	NA	NA	NA	3.2	1.76
2918	447	101	11	5	NA	2	7	3.5.1	1	3	1	2	9	3	1	5	3.95	2.18	
2420	382	102	11	5	NA	1	2	3.2	1	3	1	0	4	3	1	88	2.2	1.53	
2321	338	103	11	5	NA	1	2	3.4.1	4	4	2	NA	7	NA	2	88	2.11	1.41	
2321	338	104	11	5	NA	1	2	3.4.1	5	4	1	NA	9	NA	1	88	1.42	1.11	
3171	481	105	11	5	NA	1	2	10.1	1	NA	4	NA	NA	NA	NA	NA	3.38	2.15	
3139	477	106	11	5	NA	1	2	10.3	1	NA	2	NA	NA	NA	NA	NA	2.55	2.27	
3139	477	107	11	5	NA	1	2	13	5	4	2	NA	8	NA	1	88	2.33	1.75	
3139	477	108	11	5	NA	1	2	2.1	1	3	2	2	5	3	1	4	2.3	1.71	
3139	477	109	11	5	NA	1	2	7.3	4	NA	1	NA	NA	NA	NA	NA	1.63	1.45	
3632	537	110	11	5	NA	2	19	2.1	1	3	2	2	8	3	1	4	2.54	2.05	
3632	537	111	11	5	NA	1	2	10.3	1	NA	2	NA	NA	NA	NA	NA	2.52	1.27	
3632	537	112	11	5	NA	1	6	3.1	5	4	1	NA	8	NA	1	88	2.32	1.61	
3632	537	113	11	5	NA	1	2	18	1	4	2	NA	2	NA	1	88	2.11	1.95	
3632	537	114	11	5	NA	1	2	3.9.1	5	4	1	NA	8	NA	1	4	2.6	1.52	
3632	537	115	11	5	NA	1	2	10.1	1	NA	2	NA	NA	NA	NA	NA	3.07	1.98	
3632	537	115	11	5	NA	2	19	7.2	4	NA	1	NA	NA	NA	NA	NA	1.83	1.5	
3632	537	117	11	5	NA	2	19	3.4.1	1	3	2	0	8	3	1	88	1.64	1.37	
3632	537	118	11	5	NA	2	19	2.1	1	3	3	2	5	3	3	5	2.16	1.55	
3632	537	119	11	5	NA	1	2	3.1	5	4	2	NA	2	NA	1	88	2.5	2.13	
3224	487	120	11	5	NA	1	2	2.1	4	4	2	NA	7	NA	2	4	2.5	2.46	
3224	487	121	11	5	NA	1	2	2.1	3	3	2	2	9	3	2	4	2.93	1.72	
3224	487	122	11	5	NA	1	2	2.1	4	4	2	NA	5	NA	2	88	1.8	1.06	
3224	487	123	11	5	NA	1	3	5	1	1		NA	NA	NA	NA	NA	1.97	1.21	
4154	599	124	11	5	NA	1	2	2.4	1	3	2	3	9	3	1	4	4.36	1.85	
3945	572	125	11	5	NA	1	2	3.7	5	4	3	NA	7	NA	1	4	3.04	2.54	
3945	572	126	11	5	NA	2	19	2.1	5	4	3	NA	9	NA	1	4	3.3	1.46	
1141	167	127	2	NA	NA	7	4	2.1	5	4	1	NA	6	NA	1	4	3.22	2	
1141	167	128	2	NA	NA	2	19	3.1	5	4	1	NA	8	NA	1	88	2.16	1.26	
1141	167	129	2	NA	NA	1	2	10.3	1	NA	1	NA	NA	NA	NA	NA	1.7	1.15	
1141	167	130	2	NA	NA	1	7	10.3	1	NA	2	NA	NA	NA	NA	NA	1.67	1.32	
1398	204	131	2	NA	NA	1	7	6	1	3	1	1	9	2	1	88	1.45	1.2	
84	17	132	1	NA	NA	1	15	3.2	5	4	2	NA	7	NA	1	88	1.87	1.46	

Table H.1 (cont'd)

395	62	133	2	NA	NA	1	2	10.1	1	NA	2	NA	NA	NA	NA	NA	3.3	2.55
395	62	134	2	NA	NA	1	2	20	1	3	2	2	9	3	3	4	3.7	3.85
395	62	135	2	NA	NA	1	2	6	1	3	2	3	9	3	1	4	3.15	2.3
395	62	136	2	NA	NA	1	2	3.1	1	3	2	3	6	3	1	4	2.32	1.64
881	132	137	1	NA	NA	1	8	3.1	5	4	1	NA	7	NA	1	88	1.68	1.35
881	132	138	1	NA	NA	1	2	7.3	3	NA	1	NA	NA	NA	NA	NA	2	1.18
1262	191	139	2	NA	NA	1	3	2.1	5	4	3	NA	7	NA	1	4	2.85	2.8
1262	191	140	2	NA	NA	1	4	3.1	4	4	1	NA	3	NA	2	88	1.06	0.84
1262	191	141	2	NA	NA	1	2	2.1	5	4	2	NA	7	NA	3	88	1.7	0.97
1262	191	142	2	NA	NA	1	2	10.3	1	NA	2	NA	NA	NA	NA	NA	2.02	1.15
1262	191	143	2	NA	NA	1	2	10.1	1	NA	2	NA	NA	NA	NA	NA	2.46	1.82
1262	191	144	2	NA	NA	1	2	10.3	1	NA	4	NA	NA	NA	NA	NA	2.51	1.9
182	30	145	1	NA	NA	2	19	7.3	5	NA	1	NA	NA	NA	NA	NA	1.25	0.75
1253	190	146	2	NA	NA	1	2	2.1	4	4	1	NA	5	NA	2	88	2.42	1.17
1253	190	147	2	NA	NA	2	19	3.4	4	4	1	NA	7	NA	2	88	1.9	1.37
1253	190	148	2	NA	NA	1	3	3.4.1	5	4	1	NA	7	NA	1	88	2.03	1.38
1253	190	149	2	NA	NA	1	15	3.1	4	4	1	NA	5	NA	2	4	2.56	1.39
1353	195	150	2	NA	NA	1	2	2.1	5	4	1	NA	6	NA	1	88	1.52	0.82
1353	195	151	2	NA	NA	2	19	6	1	NA	1	NA	NA	NA	NA	NA	2.08	1.59
1200	177	152	2	NA	NA	1	2	2.1	5	4	2	NA	6	NA	3	4		2.51
1200	177	153	2	NA	NA	1	2	13	5	4	2	NA	7	NA	1	4	3.45	2.16
1200	177	154	2	NA	NA	3	6	10.1	1	NA	1	NA	NA	NA	NA	NA	3.15	2.44
257	48	155	2	NA	NA	2	19	2.1	4	4	2	NA	6	NA	2	5	2.22	1.42
257	48	156	2	NA	NA	1	2	10.3	1	NA	1	NA	NA	NA	NA	NA	2.39	1.42
257	48	157	2	NA	NA	1	2	2.4.1	5	4	1	NA	6	NA	1	4	1.94	1.33
257	48	158	2	NA	NA	2	19	3.2	5	4	2	NA	8	NA	3	4	2.25	1.73
257	48	159	2	NA	NA	1	2	10.1	1	NA	2	NA	NA	NA	NA	NA	1.76	1.42
103	21	160	1	NA	NA	1	19	2.4.1	4	4	1	NA	6	NA	2	4	2.5	2.23
103	21	161	1	NA	NA	1	2	2.1	5	4	3	NA	5	NA	1	4	3.52	2.7
103	21	162	1	NA	NA	2	19	10.3	1	NA	3	NA	NA	NA	NA	NA	1.55	1.2
103	21	163	1	NA	NA	1	2	6	1	3	2	2	7	3	1	88	1.93	1.76
103	21	164	1	NA	NA	1	7	10.3	1	NA	1	NA	NA	NA	NA	NA	1.61	1.33
103	21	165	1	NA	NA	1	2	20	5	4	3	NA	5	NA	1	4	2.15	1.75
103	21	166	1	NA	NA	3	5	10.2	1	NA	1	NA	NA	NA	NA	NA	6.14	4.44

Table H.1 (cont'd)

1035	157	167	2	NA	NA	1	7	2.3	5	3	1	NA	6	NA	3	4	1.85	1.37
1145	168	168	2	NA	NA	1	22	2.7.1	1	3	2	1	6	3	1	5	1.97	1.7
1343	196	169	2	NA	NA	1	2	3.4	1	3	1	2	9	3	3	4	3.03	2.05
1343	196	170	2	NA	NA	1	2	3.8.1	5	4	3	NA	6	NA	1	2	2.23	1.79
1343	196	171	2	NA	NA	2	19	7.3	3	NA	2	NA	NA	NA	NA	NA	1.36	1.25
1208	178	172	2	NA	NA	1	3	7.4	6	NA	1	NA	NA	NA	NA	NA	1.58	1.28
1208	178	173	2	NA	NA	1	6	10.1	1	NA	1	NA	NA	NA	NA	NA	2.1	1.4
1208	178	174	2	NA	NA	2	19	3.2	4	4	2	NA	6	NA	2	88	1.66	0.85
1208	178	175	2	NA	NA	1	2	10.1	1	NA	2	NA	NA	NA	NA	NA	2.2	1.46
3926	576	176	11	5	NA	1	2	7.4	6	NA	1	NA	NA	NA	NA	NA	1.31	0.66
3926	576	177	11	5	NA	1	4	10.3	1	NA	1	NA	NA	NA	NA	NA	2.55	1.94
3666	573	178	11	5	NA	1	2	6	1	4	3	NA	7	NA	1	88	2.54	1.91
3666	573	179	11	5	NA	1	2	10.1	1	NA	3	NA	NA	NA	NA	NA	3.52	2.87
3666	573	180	11	5	NA	12	3	3.7	5	4	1	NA	7	NA	1	4	2.25	2.05
3666	573	181	11	5	NA	1	2	3.1	1	3	3	1	7	3	1	4	2.95	2.01
3666	573	182	11	5	NA	1	2	3.1	5	4	1	NA	5	NA	3	88	1.98	1.57
3666	573	183	11	5	NA	1	2	2.4	5	4	2	NA	8	NA	1	4	2.77	2.04
3666	573	184	11	5	NA	1	2	3.8.1	1	3	1	2	9	3	1	4	2.66	1.8
3666	573	185	11	5	NA	2	19	2.1	5	4	2	NA	6	NA	1	5	2.62	1.73
3666	573	186	11	5	NA	1	2	3.4	4	4	3	NA	7	NA	2	4	3.66	3.03
3666	573	187	11	5	NA	1	2	3.1	1	3	1	2	8	2	3	4	2.23	1.86
3816	553	188	11	5	NA	1	2	2.4	4	3	2	NA	9	NA	2	4	3.34	2.15
3816	553	189	11	5	NA	1	7	10.1	1	NA	1	NA	NA	NA	NA	NA	2	1.9
3461	522	190	11	5	NA	1	2	5	5	3	4	NA	9	NA	1	4	3.57	2.39
4032	588	191	11	5	NA	1	2	2.1	1	4	3	0	3	2	3	5	3.02	1.6
259	48	192	2	NA	NA	8	31	3.8.1	5	4	1	NA	6	NA	1	88	1.15	0.95
1034	157	193	2	NA	NA	8	31	2.1	1	3	1	3	9	3	3	4	1.7	1.38
431	62	194	2	NA	NA	8	30	6	1	4	3	NA	9	NA	1	88	1.64	1.55
1213	178	195	2	NA	NA	8	30	10.3	1	NA	1	NA	NA	NA	NA	NA	2.02	1.05
3020	452	196	6	NA	NA	8	31	3.5	4	4	1	NA	7	NA	2	4	1.75	1.4
3455	500	197	5	NA	NA	8	30	10.3	1	NA	1	NA	NA	NA	NA	NA	1.17	0.72
3091	463	198	6	NA	NA	8	31	2.1	1	3	2	3	6	3	3	88	1.5	1.25
3093	463	199	6	NA	NA	8	31	10.1	1	NA	1	NA	NA	NA	NA	NA	1.06	1.05
2208	328	200	10	4	NA	8	30	7.4	3	NA	1	NA	NA	NA	NA	NA	0.89	0.85

Table H.1 (cont'd)																		
3607	507	201	10	4	NA	8	31	3.5.1	5	4	2	NA	5	NA	1	5	2.1	1.68
2322	338	202	11	5	NA	1	7	7.4	6	NA	1	NA	NA	NA	NA	NA	1.68	1.68
107	21	203	1	NA	NA	1	4	3.8.1	5	4	4	NA	8	NA	1	88	1.67	1.19
1232	177	204	2	NA	NA	1	3	3.4	3	3	4	2	6	3	2	88	1.85	1.23
257	48	205	2	NA	NA	1	2	7.3	5	NA	1	NA	NA	NA	NA	NA	1.45	1.28

Table H.2: Pueblo de la Mesa Stone Tools (Variables 20-38)

Art.#	Thk.	W.	LER	LTR	LIR	LT	LG	LEA	LS	RER	RTR	RIR	RT	RG	REA	RS	DER	DTR	DIR
1	1.42	23.4	NA	NA	NA	1.3	2	NA	4	0.8	1.2	0.2	1.1	2	65	1	0.6	1	0.1
2	1.05	6.3	NA	NA	NA	2	2	NA	1	0.5	1.3	0.1	1.2	2	70	3	NA	NA	NA
3	0.78	4.1	0.8	2.1	0.1	1.2	2	60	2	0.4	1.2	0.1	1.1	2	65	1	1	1.3	0.1
4	0.7	3	0.9	2.3	0.2	1.1	2	45	1	1	3.2,1	0.2	1.2	2	75	1	1	2.1	0.2
5	0.69	1	NA	NA	NA	2	2	NA	1	0.7	1.3	0.1	2	2	65	2	NA	NA	NA
6	0.8	3.2	NA	NA	NA	2	2	NA	1	NA	NA	NA	1.1	2	NA	3	1	1.3	0.1
7	0.65	1.2	NA	NA	NA	2	2	NA	1	NA	NA	NA	1.1	2	NA	4	1	1.3	0.2
8	0.85	3.4	0.6	1	0.3	1.1	2	75	4	0.8	1	0.3	1.1	2	45	4	1	1	0.2
9	0.65	1.6	0.7	1.2	0.3	2	2	80	2	NA	NA	NA	2	2	NA	1	NA	NA	NA
10	0.35	0.8	1	3.2,1	1	1.1	2	45	4	0.3	1.2	1	2	2	60	1	NA	NA	NA
11	1	3.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
12	0.3	0.5	1	1.2	1	2	2	30	1	1	1.3	1	1.1	2	40	1	NA	NA	NA
13	1.4	13.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
14	1.4	6.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
15	0.4	1.6	0.8	1.3	0.1	1.1	2	65	1	0.8	1	0.1	1.1	2	60	1	NA	NA	NA
16	0.55	1.4	1	1	1	1.1	2	60	1	1	1.2	1	2	2	50	3	NA	NA	NA
17	0.48	1.3	1	3.1	0.4	2	2	70	1	1	1.2	0.3	2	2	75	1	NA	NA	NA
18	0.23	0.5	NA	NA	NA	2	2	NA	1	1	1	0.1	2	2	55	1	NA	NA	NA
19	0.44	1.2	NA	NA	NA	2	2	NA	1	0.6	1.3	0.3	1.1	2	65	3	1	1.2	0.2
20	0.25	0.3	1	1.2,3	1	1.1	2	45	3	1	1.3	1	1.1	2	30	3	NA	NA	NA
21	0.93	7.8	1	1.2	0.6	1.2	2	70	3	1	1	0.2	2	2	75	1	1	3.1	0.4
22	1	4.7	NA	NA	NA	2	2	NA	4	0.7	1.3	0.1	2	2	45	1	0.3	1	0.1
23	0.4	0.6	NA	NA	NA	2	2	NA	1	NA	NA	NA	2	2	NA	1	1	1.2	0.2
24	0.76	21.1	NA	NA	NA	2	2	NA	1	NA	NA	NA	2	2	NA	1	0.6	1.2	0.2
25	1.72	5.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
26	0.55	2.2	1	1.2,3	0.1	2	2	45	1	1	1.3,2	0.7	2	2	60	2	0.5	1.3	0.1
27	0.53	8	NA	NA	NA	2	2	NA	1	NA	NA	NA	1.2	2	NA	1	1	1.2	0.1
28	0.98	11.2	0.9	1.3	0.8	1.2	2	65	4	0.5	3.1	0.2	1.1	2	80	3	NA	NA	NA
29	0.36	1.2	0.9	1	0.1	2	2	60	3	NA	NA	NA	2	2	NA	1	0.5	1.3	0.2
30	0.46	0.6	1	1.2,3	1	1.1	2	65	1	1	1.3	1	2	2	60	1	NA	NA	NA
31	1.05	9.3	1	1.3,2	1	1.1	1.6	75	4	1	2.3,1	1	1.1	1.6	75	3	1	2.1,3	1
32	0.4	0.7	NA	NA	NA	1.3	2	NA	4	1	1.3,2	0.4	1.1	2	75	1	NA	NA	NA
33	0.84	3.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table H.2 (cont)

Table H.2 (cont'd)

68	0.64	1.2	1	2,3	0.7	2	2	85	1	1	3,2,1	0.8	1.1	2	80	1	1	1,2,3	0.8
69	0.52	1.8	NA	NA	NA	1.8	2	NA	2	0.6	1	0.2	1.3	2	90	4	0.6	1,3	0.2
70	0.43	0.8	1	1,2	0.8	1.2	2	60	3	1	1,2	0.8	1.3	2	75	1	0.5	1	0.2
71	0.88	3.7	0.7	1	0.1	2	2	50	4	0.9	1,3	0.1	2	2	60	1	0.2	1	0.1
72	2.14	17.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
73	0.45	1	NA	NA	NA	1.2	2	NA	2	NA	NA	NA	1.5	2	NA	2	1	1	0.1
74	1.04	4.8	1	3,1	0.9	2	2	70	3	1	1,3	0.5	1.3	2	65	3	1	1,3	0.5
75	1.12	9.4	NA	NA	NA	2	2	NA	4	0.6	3,1	0.3	1.2	2	60	4	NA	NA	NA
76	1.15	2.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
77	0.58	1.6	NA	NA	NA	2	2	NA	1	0.4	1,3	0.6	1.2	2	85	4	NA	NA	NA
78	0.75	4.3	1	3,1,2	0.3	1.1	2	70	4	NA	NA	NA	2	2	NA	1	1	1,3,2	0.3
79	0.87	1.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
80	0.45	1.4	1	1,3	0.9	1.7	2	50	4	1	1,3	1	1.2	2	60	4	1	2,3,1	1
81	2.05	31.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
82	1.1	3.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
83	0.27	0.8	0.7	1	0.1	2	2	65	1	NA	NA	NA	2	2	NA	2	NA	NA	NA
84	0.75	3.8	NA	NA	NA	2	2	NA	1	NA	NA	NA	1.1	2	NA	3	0.6	1	0.1
85	0.48	2.3	0.6	1	0.2	2	2	45	4	0.5	1	0.1	2	2	60	1	NA	NA	NA
86	0.44	1.7	NA	NA	NA	NA	2	NA	1	NA	NA	NA	2	2	NA	3	NA	NA	NA
87	1	1.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
88	1.02	2.2	NA	NA	NA	2	2	NA	2	NA	NA	NA	2	2	NA	2	0.6	1	0.1
89	0.37	0.6	0.7	1	0.6	1.1	2	50	3	NA	NA	NA	1.3	2	NA	2	NA	NA	NA
90	1.52	6.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
91	0.93	1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
92	0.52	1.3	0.8	2,3,1	0.2	1.2	2	65	1	0.4	1	0.6	1.4	2	50	2	NA	NA	NA
93	0.58	1.5	NA	NA	NA	2	2	NA	1	0.8	1	0.2	2	2	60	1	NA	NA	NA
94	0.38	0.2	NA	NA	NA	1.8	2	NA	4	1	1,3	1	2	2	40	1	NA	NA	NA
95	0.76	3.4	1	1,2	0.3	2	2	65	1	1	2,1,3	0.3	1.2	2	70	1	1	1,2,3	0.3
96	0.96	4.2	NA	NA	NA	2	2	NA	1	1	2,1	0.3	1.2	2	60	3	1	1	0.2
97	0.78	5.3	NA	NA	NA	2	2	NA	1	0.7	1	0.1	2	2	55	1	NA	NA	NA
98	0.63	3.6	NA	NA	NA	1.2	2	NA	4	NA	NA	NA	2	2	NA	1	0.5	1	0.1
99	0.91	2.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
100	1.28	7.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
101	0.58	4.9	1	1	0.3	2	2	50	3	0.5	1,2	0.1	2	2	70	1	NA	NA	NA

Table H.2 (cont'd)

102	0.46	1.4	NA	NA	NA	NA	2	2	NA	3	NA	NA	NA	2	2	NA	2	1	3,2,1	0.3
103	0.73	1.9	NA	NA	NA	NA	2	2	NA	4	1	1	0.2	2	2	75	4	0.5	1	0.2
104	0.37	0.5	1	1	0.8	1.1	2	2	70	3	NA	NA	NA	2	2	NA	1	1	1,2	1
105	1.15	8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
106	1.84	9.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
107	0.7	1.6	NA	NA	NA	2	2	2	NA	4	0.3	1	0.1	2	2	75	1	0.3	1	0.1
108	0.84	2.4	NA	NA	NA	2	2	2	NA	1	NA	NA	NA	1.3	2	NA	1	0.9	1	0.1
109	0.53	1.1	1	1,2	0.9	1.3	2	2	65	4	1	1,2	1	2	2	65	3	NA	NA	NA
110	0.46	1.7	0.7	1,2	0.1	2	2	2	40	1	NA	NA	NA	1.5	2	NA	4	NA	NA	NA
111	1.12	2.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2	2	NA	NA	NA	NA	NA
112	0.48	1.9	1	1,3	0.2	1.1	2	2	55	1	NA	NA	NA	2	2	NA	1	NA	NA	NA
113	0.68	1.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
114	0.45	1.8	1	1,2	0.3	1.2	2	2	65	3	0.8	1,2	0.3	2	2	65	1	1	1	0.2
115	1.15	6.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
115	0.48	0.9	1	1	1	1.3	2	2	50	4	1	1,2	1	1.2	2	85	4	1	1	1
117	0.47	1.4	0.6	3,1	0.3	2	2	2	90	1	NA	NA	NA	2	2	NA	1	1	1,2	0.4
118	0.68	2.2	NA	NA	NA	NA	2	2	NA	1	0.5	1	0.1	2	2	55	4	NA	NA	NA
119	0.46	2.7	NA	NA	NA	NA	2	2	NA	4	NA	NA	NA	2	2	NA	4	0.3	1	0.1
120	0.71	3.7	0.7	1	0.1	1.3	2	2	75	3	NA	NA	NA	2	2	NA	4	NA	NA	NA
121	0.8	3.2	0.8	1	0.1	2	2	2	50	4	NA	NA	NA	2	2	NA	1	NA	NA	NA
122	0.51	0.8	NA	NA	NA	1.6	2	2	NA	1	0.3	1	0.1	1.3	2	80	1	NA	NA	NA
123	0.3	0.5	1	1,2	1	2	2	2	40	1	1	1,3	1	1.3	2	40	1	NA	NA	NA
124	0.83	5.2	0.8	1	0.1	2	2	2	50	2	0.4	1	0.1	2	2	65	3	NA	NA	NA
125	0.77	3.3	0.6	1,3	0.3	1.2	2	2	65	4	0.6	1,3	0.3	1.2	2	60	2	0.5	1	0.2
126	0.83	4.3	NA	NA	NA	2	2	2	NA	4	NA	NA	NA	2	2	NA	4	0.7	1,3	0.3
127	0.76	4.4	NA	NA	NA	1.2	2	2	NA	1	NA	NA	NA	2	2	NA	1	0.5	1	0.1
128	0.35	1.2	NA	NA	NA	1.5	2	2	NA	4	NA	NA	NA	2	2	NA	1	0.8	1,2	0.4
129	0.77	1.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
130	1.11	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
131	0.54	0.8	1	1,3	1	1.1	2	2	60	3	1	1,3	1	2	2	60	3	1	1	1
132	0.46	1.3	1	1,3,2	0.7	2	2	2	50	1	NA	NA	NA	2	2	NA	4	NA	NA	NA
133	1.87	12.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
134	1.37	15.3	0.8	1	0.1	2	2	2	85	4	0.7	1,3	0.2	2	2	75	4	NA	NA	NA
135	1.2	7.3	1	2,1,3	0.6	1.3	2	2	75	4	NA	NA	NA	2	2	NA	4	1	2,1	0.8

Table H.2 (cont'd)

136	0.71	3	0.3	1	0.2	2	2	75	4	NA	NA	NA	2	2	NA	1	NA	NA	NA
137	0.75	1.4	1	1	0.3	2	2	75	3	NA	NA	NA	2	2	NA	2	NA	NA	NA
138	0.47	1	1	1,2	1	1,2	2	50	4	1	1,3	1	1,2	2	80	4	NA	NA	NA
139	1.14	7.2	0.3	1,3	0.1	1,3	2	40	3	NA	NA	NA	2	2	NA	4	NA	NA	NA
140	0.27	0.3	1	1	0.3	2	2	70	1	NA	NA	NA	2	2	NA	1	NA	NA	NA
141	0.44	0.7	NA	NA	NA	2	2	NA	4	NA	NA	NA	2	2	NA	1	1,3	0.2	0.2
142	1.02	1.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
143	1.02	XXXX	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
144	0.96	3.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
145	0.37	0.2	1	1	0.8	2	2	50	1	NA	NA	NA	2	2	NA	1	1	1,3	0.8
146	0.52	1.5	NA	NA	NA	2	2	NA	1	NA	NA	NA	2	2	NA	3	0.8	1	0.1
147	0.46	1	9	1,2	0.3	1,2	2	50	3	0.6	1	0.3	1,4	2	70	4	NA	NA	NA
148	0.7	1.6	1	1,3	0.4	1,1	2	75	1	NA	NA	NA	2	2	NA	4	1	1,3	0.3
149	0.5	1.9	NA	NA	NA	2	2	NA	1	NA	NA	NA	2	2	NA	3	0.4	1	0.3
150	0.42	0.4	NA	NA	NA	2	2	NA	4	NA	NA	NA	1,2	2	NA	4	0.5	1	0.2
151	0.83	2.9	1	2,3,1	1	1,1	2	80	3	1	1,3,2	1	1,2	2	85	1	1	2,3,1	1
152	2.26	0.55	3	0.6	1,2	0.1	1,2	85	1	NA	NA	NA	2	2	NA	1	NA	NA	NA
153	0.87	4.2	0.4	1	0.1	2	2	45	4	NA	NA	NA	2	2	NA	4	NA	NA	NA
154	1.85	9.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
155	0.37	1.2	NA	NA	NA	1.8	2	NA	4	0.7	1	0.1	2	2	60	1	NA	NA	NA
156	0.75	2.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2	2	NA	NA	NA	NA	NA
157	0.72	1.4	0.6	1	0.1	1,2	2	60	3	NA	NA	NA	2	2	NA	4	0.7	1	0.1
158	0.38	1.2	0.4	3,1	0.3	1,3	2	65	4	NA	NA	NA	2	2	NA	4	NA	NA	NA
159	1.25	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
160	0.9	3.6	0.3	1	0.1	2	2	85	2	0.3	1	0.1	2	2	85	2	NA	NA	NA
161	1.13	8.2	0.7	1,3	0.1	1,1	2	70	4	NA	NA	NA	2	2	NA	3	NA	NA	NA
162	0.6	0.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
163	0.38	1.2	0.7	1	0.1	1,1	2	75	3	1	1,3	0.7	1,1	2	55	3	1	1,2	0.4
164	0.75	1.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
165	0.59	2.5	NA	NA	NA	2	2	NA	2	0.8	2,3,1	0.3	2	2	90	2	0.9	1,2	0.6
166	2.2	53.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
167	0.34	0.7	NA	NA	NA	2	2	NA	1	NA	NA	NA	2	2	NA	2	0.5	1	0.1
168	0.7	2.6	0.7	3,1	0.1	1,2	2	75	1	0.5	1,3	0.1	1,2	2	60	1	0.9	3,2,1	0.2
169	0.96	5.7	0.7	1	0.2	1,1	2	75	4	1	3,1	0.4	2	2	80	3	NA	NA	NA

Table H.2 (cont'd)

170	0.63	2.1	0.8	2,3,1	0.3	2	2	85	1	0.7	3,1	0.3	2	2	65	1	0.9	1	0.1
171	0.37	0.5	1	1,3	0.6	2	2	60	4	1	1,3,2	1	2	2	60	4	NA	NA	NA
172	0.28	0.4	1	1,2,3	1	2	2	65	4	1	1	1	2	2	60	1	NA	NA	NA
173	0.89	1.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
174	0.38	0.4	1	1,3	0.5	2	2	75	4	NA	NA	NA	2	2	NA	4	NA	NA	NA
175	0.83	3.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
176	0.23	0.1	1	1	1	2	2	45	1	1	1,3	1	2	2	40	1	NA	NA	NA
177	0.75	3.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
178	0.93	4.3	1	1	0.2	2	2	70	3	NA	NA	NA	2	2	NA	4	1	2,3,1	0.4
179	0.87	8.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
180	0.75	3.5	0.3	1,22	0.7	2	2	70	4	0.8	1,3	0.6	2	2	65	1	1	1	0.5
181	0.95	4.5	NA	NA	NA	2	2	NA	4	0.4	2,3,1	0.2	2	2	85	1	NA	NA	NA
182	0.33	1	NA	NA	NA	2	2	NA	4	NA	NA	NA	2	2	NA	1	NA	NA	NA
183	0.64	3.3	0.2	1	0.1	1.2	2	45	3	0.7	1	0.1	2	2	55	1	NA	NA	NA
184	0.9	3.7	0.7	1,3,2	0.2	2	2	60	2	0.3	1	0.1	2	2	70	2	1	3,2,1	0.4
185	0.35	1.7	0.4	1	0.1	2	2	50	1	NA	NA	NA	2	2	NA	1	NA	NA	NA
186	1.36	7.9	NA	NA	NA	2	2	NA	4	1	1,2	0.2	2	2	60	1	NA	NA	NA
187	0.35	1.6	1	2,3,1	0.2	2	2	65	1	NA	NA	NA	1.7	2	NA	4	NA	NA	NA
188	0.65	4.7	0.3	1	0.1	2	2	60	3	0.2	1	0.1	2	2	50	3	NA	NA	NA
189	0.83	2.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
190	0.98	7.5	NA	NA	NA	1.4	2	NA	4	1	3,1,2	0.6	1.1	2	60	1	NA	NA	NA
191	0.75	3.1	NA	NA	NA	2	2	NA	4	NA	NA	NA	2	2	NA	4	0.9	1	0.1
192	0.25	0.2	0.5	1,3	0.3	2	2	60	4	0.8	1	0.2	2	2	60	3	1	1	0.2
193	0.63	1.3	NA	NA	NA	2	2	NA	2	0.3	1	0.1	2	2	55	1	NA	NA	NA
194	0.59	1.6	1	1	0.4	1.1	2	70	1	0.4	3,1	0.5	2	2	85	3	1	1,3	0.4
195	1.1	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
196	0.58	1.2	1	1	0.2	1.1	2	55	1	0.7	1,3	0.1	1.4	2	50	4	NA	NA	NA
197	0.35	0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
198	0.35	0.5	NA	NA	NA	1.8	2	NA	1	0.7	1	0.1	2	2	45	3	NA	NA	NA
199	0.61	0.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
200	0.3	0.1	1	3,1	1	2	2	40	1	1	3,1	1	1.2	2	50	1	NA	NA	NA
201	0.43	1.4	NA	NA	NA	1.3	2	NA	4	1	1,3	0.3	2	2	60	3	0.8	1	0.2
202	0.48	1.2	1	1,2	1	2	2	45	1	1	1	1	2	2	50	1	NA	NA	NA
203	0.37	0.7	NA	NA	NA	2	2	NA	1	1	1	0.4	2	2	75	1	1	1,2	0.3

Table H.2 (cont'd)																			
204	0.29	0.8	0.8	1,2	0.2	2	2	50	4	0.7	1,3	0.1	1.2	2	75	3	NA	NA	NA
205	0.52	0.8	1	1	1	2	2	50	3	1	1,2	1	2	2	70	3	NA	NA	NA

Table H.3: Pueblo de la Mesa Stone Tools (Variables 39-56)

Art.#	DT	Noth.	DG	DEA	DS	PER	PTR	PIR	PT	PG	PEA	PS	OS	TS	Lo.S	E	N	L
1	2	NA	2	75	4	NA	NA	NA	2	2	NA	1	8	12	9	521	536	7A
2	1.4	NA	2	NA	1	NA	NA	NA	2	2	NA	4	8	3	9	521	536	7A
3	2	NA	2	55	1	NA	NA	NA	2	2	NA	4	8	12	3	521	536	7A
4	1.2	NA	2	55	3	NA	NA	NA	1.8	2	NA	3	8	3	3	521	536	4
5	2	NA	2	NA	4	NA	NA	NA	2	2	NA	1	8	3	9	521	536	4
6	1.1	NA	2	80	1	NA	NA	NA	2	2	NA	4	8	12	9	521	536	4
7	2	NA	2	70	1	NA	NA	NA	2	2	NA	4	8	12	9	521	536	4
8	1.1	NA	2	60	2	NA	NA	NA	1.3	2	NA	3	8	12	9	521	536	2
9	2	NA	2	NA	4	NA	NA	NA	2	2	NA	4	8	12	9	521	536	2
10	2	NA	2	NA	4	0.3	1	1	2	2	50	1	8	8	5	521	536	2
11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	521	536	2
12	2	NA	2	NA	1	1	1.2	1	1.1	2	40	1	8	12	9	521	536	7A
13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	521	536	7A
14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	521	536	7A
15	2	NA	2	NA	4	NA	NA	NA	2	2	NA	4	8	3	9	521	536	7B
16	2	NA	2	NA	1	1	1.3,2	1	2	2	60	1	9	8	9	521	536	7B
17	2	NA	2	NA	1	NA	NA	NA	2	2	NA	1	9	5	9	521	536	7B
18	2	NA	2	NA	1	NA	NA	NA	1.1	2	NA	1	9	11	5	521	536	7B
19	2	NA	2	55	3	NA	NA	NA	2	2	NA	1	8	12	9	521	536	7B
20	2	NA	2	NA	4	1	3,1	1	1.2	2	65	1	5	11	5	521	536	7B
21	1.2	NA	2	55	1	NA	NA	NA	2	2	NA	1	8	12	9	521	536	7B
22	1.1	NA	2	50	1	NA	NA	NA	2	2	NA	3	8	12	9	521	536	7B
23	2	NA	2	50	1	NA	NA	NA	2	2	NA	1	8	12	9	521	536	7B
24	2	NA	2	65	1	NA	NA	NA	2	2	NA	1	8	12	9	521	536	7B
25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	521	536	7B
26	2	NA	2	70	1	NA	NA	NA	2	2	NA	1	8	12	9	521	536	7B
27	2	NA	2	75	3	NA	NA	NA	2	2	NA	3	8	12	9	SWM	TUIN	2
28	2	NA	2	NA	1	NA	NA	NA	2	2	NA	1	8	12	9	SWM	TUIN	2
29	1.2	NA	2	50	1	NA	NA	NA	2	2	NA	3	8	12	9	SWM	TUIN	2
30	2	NA	2	NA	1	NA	NA	NA	2	2	NA	1	8	8	9	SWM	TUIN	2
31	1.2	NA	2	85	3	NA	NA	NA	2	2	NA	1	2	5	12	SWM	TUIN	2
32	2	NA	2	NA	1	NA	NA	NA	2	2	NA	1	8	12	9	SWM	TUIN	1
33	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	NWM	TU6N	2

Table H.3 (cont'd)

	34	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	NWM	TU6N	2
	35	2	NA	2	NA	1	NA	NA	NA	NA	2	2	NA	1	8	12	9	9	NWM	TU6N	2	
	36	2	NA	2	80	3	NA	NA	NA	NA	2	2	NA	4	8	12	9	9	NWM	TU6N	1	
	37	1.1	NA	2	75	3	NA	NA	NA	NA	2	2	NA	3	2	12	9	9	NWM	TU6N	1	
	38	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	9	NWM	TU6N	1	
	39	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	9	NWM	TU6N	1	
	40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	9	NWM	TU6N	1	
	41	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	9	NWM	TU6N	1	
	42	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	9	NWM	TU6N	6	
	43	2	NA	2	70	3	1	2,3,1	0.3	1.5	2	2	80	4	8	12	9	9	NWM	TU6N	6	
	44	2	NA	2	NA	1	NA	NA	NA	2	2	2	NA	1	8	12	9	9	517	507	10	
	45	2	NA	2	NA	1	0.7	1,3	0.2	1.1	2	2	70	1	5	12	7	517	507	10		
	46	2	NA	2	90	1	1	3,1	1	1.2	2	2	65	3	2	8	9	9	517	507	10	
	47	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	9	517	507	10	
	48	2	NA	2	50	1	NA	NA	NA	2	2	2	NA	1	8	12	9	9	517	507	13	
	49	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	9	517	507	13	
	50	2	NA	2	70	3	NA	NA	NA	2	2	2	NA	4	8	12	9	9	517	507	13	
	51	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	9	517	507	8	
	52	2	NA	2	NA	1	1	1,3	0.1	2	2	2	55	1	8	12	9	9	517	507	8	
	53	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	9	517	507	7	
	54	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	9	SWM	TUIS	2	
	55	2	NA	2	80	3	NA	NA	NA	2	2	2	NA	4	8	12	9	9	SWM	TUIS	2	
	56	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	9	SWM	TUIS	2	
	57	2	NA	2	NA	1	NA	NA	NA	2	2	2	NA	1	8	11	9	9	SWM	TUIS	2	
	58	2	NA	2	75	1	NA	NA	NA	2	2	2	NA	1	8	12	9	9	SWM	TUIS	2	
	59	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	9	SWM	TUIS	0	
	60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	9	SWM	TUIS	1	
	61	2	NA	2	NA	1	NA	NA	NA	2	2	2	NA	1	8	12	9	9	SWM	TUIS	3	
	62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	9	SWM	TUIS	3	
	63	2	NA	2	80	4	NA	NA	NA	2	2	2	NA	1	8	12	9	9	507	537	1	
	64	2	NA	2	80	2	NA	NA	NA	2	2	2	NA	1	8	12	9	9	507	537	1	
	65	2	NA	2	NA	1	NA	NA	NA	2	2	2	NA	1	8	12	9	9	507	537	1	
	66	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	9	507	537	1	
	67	2	NA	2	50	3	NA	NA	NA	2	2	2	NA	1	8	8	9	9	507	537	1	

Table H.3 (cont'd)

68	2	NA	2	85	1	NA	NA	NA	2	2	NA	1	8	12	9	507	537	1
69	1.2	NA	2	65	4	NA	NA	NA	2	2	NA	1	8	12	9	507	537	1
70	2	NA	2	65	4	NA	NA	NA	1.3	2	NA	1	8	8	4	507	537	1
71	1.4	NA	2	50	3	NA	NA	NA	2	2	NA	1	8	3	9	507	537	1
72	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	507	537	1
73	2	NA	2	70	1	NA	NA	NA	2	2	NA	1	8	12	9	507	537	1
74	2	NA	2	85	3	1	2,1,3	0.5	1.2	2	85	4	2	5	1	507	537	1
75	2	NA	2	NA	1	0.8	1,3	0.2	1.2	2	85	2	8	12	9	507	537	1
76	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	507	541	1
77	2	NA	2	NA	3	NA	NA	NA	2	2	NA	1	8	12	9	507	541	1
78	1.1	NA	2	60	1	NA	NA	NA	2	2	NA	1	8	12	9	507	541	1
79	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	507	541	1
80	2	NA	2	80	3	1	1,3,2	1	2	2	45	3	2	8	5	507	541	1
81	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	507	541	1
82	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	507	541	1
83	2	NA	2	NA	3	NA	NA	NA	2	2	NA	4	8	12	9	507	541	1
84	1.1	NA	2	45	1	NA	NA	NA	2	2	NA	4	8	12	9	516	506	9 10
85	1.2	NA	2	NA	3	0.8	1,3	0.2	1.2	2	90	2	8	12	9	516	506	9 10
86	1.6	NA	2	NA	1	0.8	1,3	0.2	1.2	2	60	1	8	12	9	516	506	9 10
87	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	516	506	9 10
88	2	NA	2	30	3	NA	NA	NA	2	2	NA	1	8	12	9	516	506	9 10
89	2	NA	2	NA	3	NA	NA	NA	2	2	NA	1	8	12	9	516	506	9 10
90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	516	506	9 10
91	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	516	506	9 10
92	1.3	NA	2	1	45	NA	NA	NA	2	2	NA	1	8	12	9	516	506	9 10
93	2	NA	2	NA	4	NA	NA	NA	2	2	NA	1	8	12	9	516	506	9 10
94	1.8	NA	2	NA	1	NA	NA	NA	1.9	2	NA	4	8	12	9	516	506	3
95	1.2	NA	2	55	1	NA	NA	NA	2	2	NA	1	8	12	9	516	506	6
96	2	NA	2	45	1	NA	NA	NA	2	2	NA	1	8	12	9	516	506	6
97	2	NA	2	NA	1	NA	NA	NA	2	2	NA	1	8	12	9	516	506	6
98	1.5	NA	2	50	4	NA	NA	NA	2	2	NA	4	8	12	9	516	506	5
99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	516	506	4
100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	516	506	11
101	2	NA	2	NA	4	NA	NA	NA	2	2	NA	1	8	12	9	520	537	7A

Table H.3 (cont'd)																					
102	2	NA	2	80	3	NA	NA	NA	NA	2	2	2	NA	3	8	12	9	520	537	1	5
103	1.2	NA	2	65	4	NA	NA	NA	NA	2	2	2	NA	4	8	12	9	520	537	4	4
104	2	NA	2	50	3	NA	NA	NA	NA	2	2	2	NA	4	8	12	9	520	537	4	4
105	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	520	537	8A	8A
106	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	520	537	7B	7B
107	2	NA	2	70	1	NA	NA	NA	NA	2	2	2	NA	4	8	12	9	520	537	7B	7B
108	2	NA	2	45	1	NA	NA	NA	NA	2	2	2	NA	1	8	12	9	520	537	7B	7B
109	2	NA	2	NA	1	NA	NA	NA	NA	2	2	2	NA	4	8	8	9	520	537	7B	7B
110	2	NA	2	NA	4	NA	NA	NA	NA	2	2	2	NA	4	8	12	9	520	537	9	9
111	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	520	537	9	9
112	2	NA	2	NA	1	NA	NA	NA	NA	2	2	2	NA	1	8	12	9	520	537	9	9
113	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5	12	9	520	537	9	9
114	1.2	NA	2	70	3	NA	NA	NA	NA	2	2	2	NA	1	8	12	9	520	537	9	9
115	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	520	537	9	9
115	1.3	NA	2	85	4	1	1	1	1	1.2	2	2	50	4	8	12	9	520	537	9	9
117	2	NA	2	50	1	NA	NA	NA	NA	2	2	2	NA	1	8	12	9	520	537	9	9
118	2	NA	2	NA	1	NA	NA	NA	NA	2	2	2	NA	4	8	12	9	520	537	9	9
119	1.2	NA	2	75	4	NA	NA	NA	NA	2	2	2	NA	4	8	12	9	520	537	9	9
120	2	NA	2	NA	1	NA	NA	NA	NA	2	2	2	NA	1	8	12	9	520	537	8B	8B
121	2	NA	2	NA	4	NA	NA	NA	NA	2	2	2	NA	4	8	12	9	520	537	8B	8B
122	2	NA	2	NA	1	NA	NA	NA	NA	2	2	2	NA	1	8	12	9	520	537	8B	8B
123	2	NA	2	NA	4	NA	NA	NA	NA	2	2	2	NA	1	5	11	5	520	537	8B	8B
124	2	NA	2	NA	1	NA	NA	NA	NA	2	2	2	NA	1	8	12	9	520	537	12	12
125	2	NA	2	75	3	NA	NA	NA	NA	2	2	2	NA	4	8	12	9	520	537	10	10
126	1.1	NA	2	75	1	NA	NA	NA	NA	2	2	2	NA	4	8	12	9	520	537	10	10
127	2	NA	2	80	1	NA	NA	NA	NA	2	2	2	NA	4	8	12	9	520	537	10	10
128	1.2	NA	2	60	1	NA	NA	NA	NA	2	2	2	NA	1	8	12	9	517	496	3	3
129	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	517	496	3	3
130	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	517	496	3	3
131	2	NA	2	55	3	NA	NA	NA	NA	2	2	2	NA	3	2	5	3	518	496	7	7
132	2	NA	2	NA	3	NA	NA	NA	NA	2	2	2	NA	1	8	12	9	515	531	0	0
133	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	504	500	2	2
134	2	NA	2	NA	1	NA	NA	NA	NA	2	2	2	NA	4	8	12	9	504	500	2	2
135	2	NA	2	90	3	NA	NA	NA	NA	2	2	2	NA	1	8	12	9	504	500	2	2

Table H.3 (cont'd)

136	2	NA	2	NA	4	NA	NA	NA	NA	2	2	NA	1	8	12	9	504	500	2
137	2	NA	2	NA	2	NA	NA	NA	NA	2	2	NA	1	8	12	9	515	531	3
138	2	NA	2	NA	1	1	1,3,2	1	NA	1.1	2	50	4	8	12	9	515	531	3
139	2	NA	2	NA	3	NA	NA	NA	NA	2	2	NA	1	8	12	9	518	496	5
140	2	NA	2	NA	1	NA	NA	NA	NA	2	2	NA	1	8	12	9	518	496	5
141	2	NA	2	65	1	NA	NA	NA	NA	2	2	NA	1	8	12	9	518	496	5
142	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	518	496	5
143	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	518	496	5
144	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	518	496	5
145	2	NA	2	65	1	NA	NA	NA	NA	2	2	NA	3	8	12	9	515	531	3
146	2	NA	2	NA	2	NA	NA	NA	NA	2	2	NA	1	8	12	9	517	496	5
147	2	NA	2	NA	1	NA	NA	NA	NA	2	2	NA	4	8	12	9	517	496	5
148	1.1	NA	2	75	4	NA	NA	NA	NA	2	2	NA	4	8	12	9	517	496	5
149	2	NA	2	65	2	NA	NA	NA	NA	2	2	NA	1	8	12	9	517	496	5
150	2	NA	2	65	1	NA	NA	NA	NA	2	2	NA	1	8	12	9	517	496	6
151	2	NA	2	75	3	NA	NA	NA	NA	2	2	NA	3	8	12	9	517	496	6
152	2	NA	2	NA	1	NA	NA	NA	NA	2	2	NA	1	8	12	9	517	496	4
153	2	NA	2	NA	4	NA	NA	NA	NA	2	2	NA	1	8	12	9	517	496	4
154	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	517	496	4
155	1.8	NA	2	NA	4	NA	NA	NA	NA	2	2	NA	1	8	12	9	504	500	1
156	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	504	500	1
157	1.3	NA	2	70	1	NA	NA	NA	NA	2	2	NA	4	8	12	9	504	500	1
158	2	NA	2	NA	4	NA	NA	NA	NA	2	2	NA	4	8	12	9	504	500	1
159	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	504	500	1
160	2	NA	2	NA	4	NA	NA	NA	NA	2	2	NA	1	8	12	9	515	531	1
161	2	NA	2	NA	4	NA	NA	NA	NA	2	2	NA	4	8	12	9	515	531	1
162	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	515	531	1
163	2	NA	2	60	3	NA	NA	NA	NA	2	2	NA	1	2	11	9	515	531	1
164	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	515	531	1
165	2	NA	2	65	2	NA	NA	NA	NA	2	2	NA	4	8	12	9	515	531	1
166	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	515	531	1
167	2	NA	2	NA	65	NA	NA	NA	NA	2	2	NA	4	8	12	9	517	496	2
168	2	NA	2	90	1	NA	NA	NA	NA	2	2	NA	1	8	12	9	518	496	3
169	2	NA	2	NA	1	NA	NA	NA	NA	2	2	NA	1	8	12	9	518	496	6

Table H.3 (cont'd)

170	2	NA	2	60	1	NA	NA	NA	NA	2	2	NA	1	8	12	9	518	496	6
171	2	NA	2	NA	1	1	3,1	0.3	75	2	2	2	3	8	12	9	518	496	6
172	2	NA	2	NA	4	NA	NA	NA	NA	2	2	2	1	8	11	5	518	496	4
173	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	518	496	4
174	2	NA	2	NA	1	NA	NA	NA	NA	2	2	2	1	8	12	9	518	496	4
175	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	518	496	4
176	2	NA	2	NA	4	NA	NA	NA	NA	2	2	2	1	5	8	5	521	536	BU
177	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	521	536	BU
178	2	NA	2	90	3	NA	NA	NA	NA	2	2	2	1	8	12	9	521	536	8
179	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	521	536	8
180	2	NA	2	70	1	NA	NA	NA	NA	2	2	2	1	8	12	9	521	536	8
181	2	NA	2	NA	1	NA	NA	NA	NA	2	2	2	4	8	12	9	521	536	8
182	2	NA	2	NA	4	1	1	0.2	60	2	2	2	3	8	12	9	521	536	8
183	2	NA	2	NA	4	NA	NA	NA	NA	2	2	2	4	8	12	9	521	536	8
184	2	NA	2	55	3	NA	NA	NA	NA	2	2	2	4	8	12	9	521	536	8
185	2	NA	2	NA	3	NA	NA	NA	NA	2	2	2	4	8	12	9	521	536	8
186	2	NA	2	NA	1	NA	NA	NA	NA	2	2	2	4	8	12	9	521	536	8
187	2	NA	2	NA	3	NA	NA	NA	NA	2	2	2	1	8	12	9	521	536	8
188	2	NA	2	NA	4	NA	NA	NA	NA	2	2	2	4	8	12	9	521	536	8
189	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	521	536	BU3
190	2	NA	2	NA	4	NA	NA	NA	NA	2	2	2	3	8	12	9	521	536	BU3
191	2	NA	2	80	1	NA	NA	NA	NA	2	2	2	4	8	12	9	521	536	CU
192	2	NA	2	60	3	NA	NA	NA	NA	1.4	2	2	4	8	12	9	504	500	1
193	2	NA	2	NA	1	NA	NA	NA	NA	2	2	2	3	8	12	9	517	496	2
194	1.1	NA	2	80	3	NA	NA	NA	NA	2	2	2	4	8	5	3	504	500	2
195	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	518	496	4
196	2	NA	2	NA	1	NA	NA	NA	NA	2	2	2	1	8	12	9	SWM	TUIS	2
197	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	NWM	TU6N	2
198	2	NA	2	NA	3	NA	NA	NA	NA	2	2	2	1	8	12	9	SWM	TUIS	3
199	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	12	9	SWM	TUIS	
200	2	NA	2	NA	1	1	1	1	35	2	2	2	4	8	8	9	516	506	3
201	1.2	NA	2	75	3	1	1.3	0.2	80	2	2	2	1	8	12	9	517	507	11
202	2	NA	2	NA	4	NA	NA	NA	NA	2	2	2	1	5	11	9	520	537	4
203	1.2	NA	2	70	1	1	1	0.6	70	2	2	2	1	8	5	9	515	531	1

APPENDIX I

Table I.1: Pueblo de la Mesa Projectile Points (Variables 1 – 19)

Bag#	Lot#	Art.#	Prov.	St.#	Ft.	R.M.	Col.	Cor.	Con.	PT	FTO	FTN	Len.	Wid.	Thk.	W.	BW	BT
3257	486	1	11	5	NA	1	2	1	1	4	NA	NA	2.42	1.3	0.28	0.7	1.31	0.19
2058	311	2	11	5	NA	1	2	1	7	8	NA	NA	2.11	1.09	0.35	0.6	0.95	0.22
320	320	3	11	5	NA	1	7	1	4	4	NA	NA	1.64	0.98	0.21	0.4	0.44	0.2
2827	435	4	6	NA	NA	1	5	1	1	3	NA	NA	1.64	1.24	0.25	0.5	1.24	0.24
3430	498	5	11	5	NA	2	11	1	3	3	NA	NA	1.51	1.15	0.25	0.4	0.78	0.21
3694	533	6	1	NA	NA	1	5	1	1	8	NA	NA	2.21	0.86	0.34	1.1	0.86	0.2
3633	537	7	11	5	NA	12	7	1	5	6	NA	NA	2.04	1.63	0.31	0.7	0.57	0.23
2301	330	8	11	5	NA	2	11	1	5	6	NA	NA	2.02	1.39	0.25	0.3	1.07	0.22
3066	459	9	10	4	NA	7	4	1	1	4	NA	NA	2.33	1.26	0.3	0.8	1.25	0.25
2191	325	10	11	5	NA	1	2	1	4	3	NA	NA	1.21	0.95	0.22	0.2	0.64	0.21
2191	325	11	11	5	NA	1	2	1	3	8	NA	NA	1.73	1.25	0.32	6	1.23	0.3
3652	506	12	10	4	NA	2	11	1	3	3	NA	NA	1.24	1.17	0.23	0.3	1.17	0.23
1959	301	13	11	5	NA	1	2	1	3	5	NA	NA	1.78	1.3	0.25	0.7	1.3	0.25
1959	301	14	11	5	NA	1	15	1	3	8	NA	NA	1.8	1.15	0.31	0.8	1.13	0.22
1959	301	15	11	5	NA	1	4	1	2	3	NA	NA	1.04	1.33	0.24	0.2	1.34	0.18
3692	533	16	1	NA	NA	2	19	1	4	9	NA	NA	1.05	1.01	0.28	0.3	NA	NA
3760	531	17	1	NA	NA	1	2	1	2	6	5	NA	1.27	2.77	0.57	2.1	1.16	0.58
3667	573	18	11	5	NA	1	2	1	1	8	NA	NA	2.83	0.93	0.36	1	0.9	0.26
3761	531	19	1	NA	NA	8	30	1	2	8	NA	NA	0.86	1.1	0.16	0.2	1.08	0.11
1150	167	20	2	NA	NA	8	30	1	6	1	NA	NA	2.67	1.67	0.5	1.6	1.28	0.39
37	7	21	1	NA	NA	2	19	1	1	8	NA	NA	1.9	1.49	0.34	0.8	1.54	0.19
37	7	22	1	NA	NA	1	16	1	3	6	NA	NA	1.6	1.01	0.3	0.4	0.53	0.24
1212	178	23	2	NA	NA	1	2	1	1	4	NA	NA	2.18	1.35	0.33	0.7	1.31	0.25
1345	196	24	2	NA	NA	1	4	1	5	6	NA	NA	2.86	1.8	0.37	1.8	0.84	0.32
1345	196	25	2	NA	NA	1	7	1	3	6	NA	NA	1.7	1.11	0.3	0.5	0.63	0.25
904	132	26	1	NA	NA	2	19	1	1	8	1	1	1.45	0.98	0.24	0.3	0.87	0.07
294	48	27	2	NA	NA	1	7	1	5	3	NA	NA	2.38	1.2	0.28	0.5	0.42	0.18
107	21	28	1	NA	NA	1	2	1	3	6	NA	NA	1.24	1.36	0.23	0.3	0.32	0.16
107	21	29	1	NA	NA	1	7	1	3	8	NA	NA	0.98	1.1	0.21	0.3	1.1	0.12
1394	204	30	2	NA	NA	1	12	1	1	1	NA	NA	3.29	1.67	0.55	2.8	1.52	0.44
1259	190	31	2	NA	NA	1	11	1	5	10	NA	NA	2.19	1.12	0.33	0.5	0.67	0.21

Table I.2: Pueblo de la Mesa Projectile Points (Variables 20 – 38)

Art.#	BS	HL	HWD	HWP	HT	HBS	HG	SW	ST	SS	BL	BW	BT	BS	LER	LRT	LIR	LT	LEA
1	2	0.83	0.89	1.3	0.25	NA	2	1.12	0.26	1	1.59	1.12	0.28	2	1	1,2	1	2	2
2	1	1.03	0.97	0.9	0.35	NA	1.9	1.02	0.27	NA	1.15	0.95	0.25	2	1	1,2	1	2	2
3	4	0.7	0.49	0.26	0.2	NA	2	0.78	0.2	1	0.95	0.91	0.21	2	1	1,3	1	2	45
4	3	6.8	0.82	1.24	0.25	NA	1.5	0.96	0.25	3	0.96	0.96	0.24	2	1	1,2,3	1	2	60
5	3	0.65	0.68	0.8	0.23	NA	1.6	1.05	0.24	1	0.87	0.99	0.2	2	1	1	1	2	40
6	9	1.07	1.36	0.87	0.22	NA	1.8	1.25	0.3	NA	1.05	1.18	0.34	2	1	1,3	0.7	2	50
7	11	0.3	0.57	0.57	0.21	2	2	0.62	0.3	8	1.73	1.58	0.3	5	1	1	1	2	60
8	NA	NA	NA	NA	NA	NA	2	0.95	0.23	NA	2.02	0.8	0.21	2	1	1,3	1	2	30
9	2	0.87	0.78	1.24	0.28	NA	1.9	0.98	0.3	1	1.45	0.98	0.31	2	1	1,3	1	2	75
10	NA	0.38	0.58	0.63	0.21	NA	2	0.95	0.22	1	0.85	0.83	0.22	2	1	1,3	1	1.4	70
11	1	0.67	1.05	1.24	0.31	NA	1.8	NA	NA	NA	0.97	0.94	0.31	2	1	1,3	1	2	60
12	2	0.8	0.62	1.12	0.22	NA	2	1.04	0.24	1	0.55	1.03	0.22	9	1	1	1	2	45
13	2	1.17	1.08	1.3	0.25	NA	1.7	NA	NA	NA	0.6	1	0.27	2	1	1	1	2	50
14	3	0.68	1.11	1.08	0.32	NA	1.8	NA	NA	NA	0.95	1.01	0.28	2	1	1	1	2	75
15	2	1	0.69	1.34	0.2	NA	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.05	1.01	0.28	2	1	1,3,2	1	2	70
17	8	0.53	1.23	1.14	0.58	3	2	2.76	0.48	6	NA	NA	NA	NA	NA	NA	NA	NA	NA
18	3	0.91	0.89	0.91	0.3	NA	1.8	NA	NA	NA	2.05	0.9	0.33	2	1	1,3,2	1	1.1	70
19	3	0.81	0.77	1.09	0.2	NA	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	35
20	9	0.96	0.81	1.28	0.49	2	2	1.67	0.5	1	1.68	1.22	0.43	8	1	1,3	1	1.3	45
21	1	0.82	1.23	1.54	0.27	NA	1.8	NA	NA	NA	1.12	1.05	0.33	2	1	2,1,3	1	2	70
22	1	0.37	0.6	0.51	0.27	NA	2	1.02	0.29	1	1.18	0.9	0.26	2	1	1	1	2	60
23	2	0.9	0.81	1.33	0.31	NA	2	0.97	0.32	1	1.11	0.89	0.3	2	1	1,2	1	2	55
24	1	0.34	0.85	0.84	0.33	1	2	1.79	0.36	6	2.68	0.3	1.78	5	1	1	0.3	1.3	55
25	1	0.44	0.57	0.63	0.23	1	2	1.11	0.28	6	1.39	0.99	0.29	2	1	1,3,2	1	2	55
26	3	0.6	0.93	0.9	0.18	NA	1.9	NA	NA	NA	0.85	0.9	0.21	2	1	2,3,1	0.4	2	55
27	1	0.76	0.87	0.44	0.27	NA	2	1.12	0.22	2	1.69	1.1	0.22	2	1	1,3	1	2	30
28	1	0.31	0.51	0.28	0.17	1	2	1.36	0.21	NA	1.07	1.29	0.22	2	1	1,2	1	2	55
29	1	0.98	0.98	1.1	0.21	NA	1.6	NA	NA	NA	NA	NA	NA	2	NA	NA	NA	NA	60
30	9	1.04	1.25	1.51	0.44	2	1.6	1.67	0.48	1	2.33	1.64	0.57	2	1	1,3	1	2	65
31	1	0.22	0.66	0.67	0.21	NA	2	1.14	0.3	1	1.95	0.94	0.32	7	1	1,3,2	1	2	50

Table I.3: Pueblo de la Mesa Projectile Points (Variables 39-57)

Art.#	LBS	LN	RER	RRT	RIR	RT	REA	RBS	RN	BN	OS	TS	Lon.S	E	N	L	Com	Sym	BFP
1	65	0.12	1	1,2	1	2	45	1	0.15	0.22	5	11	5	521	536	7A	NA	2	4
2	45	NA	1	1,3	1	2	40	1	NA	NA	5	11	5	520	537	2	NA	2	4
3	1	NA	1	1	1	2	50	1	0.19	0.26	9	11	5	520	537	3	NA	2	4
4	1	0.13	1	1	1	2	50	1	0.16	NA	5	11	5	SWM	TUIS	0	NA	2	6
5	1	0.25	1	1,3	1	2	45	1	0.22	NA	5	11	5	521	536	7B	NA	3	4
6	3	NA	1	3,2,1	0.6	2	55	2	NA	NA	5	11	5	507	541	1	NA	2	6
7	2	0.38	1	1	1	2	60	2	0.38	NA	5	11	5	520	537	9	NA	2	6
8	1	NA	1	1,2	1	2	45	1	NA	NA	5	11	5	521	536	3 4	NA	1	4
9	1	0.05	1	1,3	1	2	70	1	0.22	0.21	5	11	5	516	506	8	NA	3	6
10	1	0.23	1	1,2	1	2	45	1	0.2	NA	5	11	5	521	536	3	NA	3	6
11	1	NA	1	1	1	2	50	1	NA	NA	5	11	5	521	536	3	NA	3	4
12	1	0.25	1	1	1	2	45	1	0.27	NA	9	11	5	516	506	9 10	NA	2	6
13	1	NA	1	1,3	1	2	65	1	NA	0.19	5	11	5	521	536	2	NA	3	6
14	1	NA	1	1	1	2	60	1	NA	NA	5	11	5	521	536	2	NA	3	6
15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9	11	5	521	536	2	NA	2	6
16	1	1	1	1,3,2	1	2	50	1	NA	NA	5	11	5	507	541	1	NA	2	6
17	NA	0.32	NA	NA	NA	NA	NA	NA	0.21	NA	9	8	6	507	537	1	NA	2	6
18	1	NA	1	1,2	1	2	60	1	NA	NA	5	8	5	521	536	8	NA	1	4
19	NA	NA	NA	NA	MA	MA	35	NA	NA	NA	5	11	5	507	537	1	NA	1	4
20	4	0.45	1	1	1	1.6	50	4	0.26	NA	5	8	5	518	496	3	NA	4	6
21	1	NA	1	1,2	1	1.2	50	1	NA	NA	5	11	5	515	531	1	NA	1	6
22	1	0.21	1	1	1	2	50	1	NA	NA	5	8	5	515	531	1	NA	3	6
23	1	0.14	1	1	1	2	55	1	0.16	0.14	5	11	5	518	496	4	NA	2	6
24	4	0.3	1	1	0.7	1.1	45	3	0.35	NA	5	5	3	518	496	6	NA	3	6
25	1	0.2	1	1,3	1	2	50	2	0.13	NA	5	8	5	518	496	6	NA	2	6
26	3	NA	1	1,3	0.3	2	65	3	NA	NA	5	6	4	515	531	3	NA	1	6
27	1	NA	1	1,3	1	2	45	1	0.29	NA	5	11	5	504	500	1		2	4
28	1	0.47	NA	1	1	1.1	50	1	0.4	NA	5	11	5	515	531	1	NA	2	6
29	NA	NA	NA	NA	NA	NA	55	NA	NA	NA	5	11	5	515	531	1	NA	1	6
30	1	0.24	1	1,3	1	2	70	1	0.12	NA	5	8	5	518	496	7	NA	2	4
31	1	0.24	1	1,2	1	2	40	6	0.19	NA	5	8	5	517	496	5	NA	5	4

BIBLIOGRAPHY

- Adams, E. Charles
1983 The Architectural Analogue to Hopi Social Organization and Room Use, and Implications for Prehistoric Northern Southwestern Culture. *American Antiquity* 48(1): 44-61.
- Ahler, Stanley A.
1989 Mass Analysis of Flaking Debris: Studying the Forest Rather than the Trees. In *Alternative Approaches to Lithic Analysis* edited by D.O. Henry and G.H. Odell, pp. 85-118. Archaeological Papers of the American Anthropological Association 1, Washington D.C.
- Amick, Daniel S.
2007 Investigating the Behavioral Causes and Archaeological Effects of Lithic Recycling. In *Tool versus Cores: Alternative Approaches to Stone Tool Analysis* edited by Shannon P. McPherron, pp. 223-252. Cambridge Scholars Publishing, Newcastle, UK.
- Amick, Daniel S., and Raymond P. Mauldin
1989 Comments on Sullivan and Rozen's "Debitage Analysis and Archaeological Interpretation. *American Antiquity* 54(1):166-168.
- Amick, Daniel S., and Raymond P. Mauldin
1997 Effects of Raw Material on Flake Breakage Patterns. *Lithic Technology* 22(1):18-32.
- Amick, Daniel S., Raymond P. Mauldin, and Steven A. Tomka
1988 An Evaluation of Debitage Produced By Bifacial Core Reduction of a Georgetown Chert Nodule. *Lithic Technology* 17(1):26-36.
- Andrefsky, Jr. William
1994 Raw-Material Availability and the Organization of Technology. *American Antiquity* 59(1):21-34.
- Andrefsky, Jr. William
2004 Partitioning the Aggregate: Mass Analysis and Debitage Assemblages. In *Aggregate Analysis in Chipped Stone*, edited by Christopher T. Hall and Mary Lou Larson, pp. 201-210. University of Utah Press, Salt Lake City.
- Andrefsky, Jr. William
2005 *Lithics: Macroscopic Approaches to Analysis*. Second Edition, Cambridge University Press, Cambridge, UK.
- Andrefsky, Jr. William

- 2006 Experimental and Archaeological Verification of an Index of Retouch for Hafted Bifaces. *American Antiquity* 71(4):743-757.
- Andrefsky, Jr. William
2007 The Application and Misapplication of Mass Analysis in Lithic Debitage Studies. *Journal of Archaeological Science* 34:392-402.
- Andrefsky, Jr. William
2008 An Introduction to Stone Tool Life History and Technological Organization. In *Lithic Technology: Measures of Production, Use, and Curation*, edited by William Andrefsky, Jr., pp. 3-22. Cambridge University Press, UK.
- Bamforth, Douglas B.
1986 Technological Efficiency and Tool Curation. *American Antiquity* 51(1):38-50.
- Binford, Lewis R.
1979 Organization and Formation Processes: Looking at Curated Technologies. *Journal of Anthropological Research* 35(3):255-273.
- Bradbury, Andrew P., and Philip J. Carr
1995 Flake Typologies and Alternative Approaches: An Experimental Assessment. *Lithic Technology* 20(2):100-115.
- Bradbury, Andrew P., and Philip J. Carr
1999 Examining Stage and Continuum Models of Flake Debris Analysis: An Experimental Approach. *Journal of Archaeological Science* 26:105-116.
- Bradbury, Andrew P., and Jay D. Franklin
2000 Raw Material Variability, Package Size, and Mass Analysis. *Lithic Technology* 25(1):42-58.
- Cameron, Catherine M.
1990 Pit Structure Abandonment in the Four Corners Region of the American Southwest: Late Basketmaker III and Pueblo I Periods. *Journal of Field Archaeology* 17(1):27-37.
- Cameron, Catherine M.
1999 Room Size, Organization of Construction, and Archaeological Interpretation in the Puebloan Southwest. *Journal of Anthropological Archaeology* 18: 201-239.
- Caperton, Thomas J.
1981 An Archaeological Reconnaissance of the Gran Quivira Area. In *Contributions to Gran Quivira Archaeology*, edited by Alden C. Hayes, pp. 3-12. Publications in Archaeology No. 17. National Park Service, Washington, D.C.

- Chamberlin, Matthew A.
2001 *Aggregation and Social Identity in Salinas: Landscape Formation from A.D. 1100-1300*. Unpublished ARI Graduate Fellowship Project. Arizona State University, Tempe, Arizona.
- Chamberlin, Matthew A.
2006 Symbolic Conflict and the Spatiality of Traditions in Small-scale Societies. *Cambridge Archaeological Journal* 16(1): 39-51.
- Ciolek-Torrello, Richard
1985 A Typology of Room Function at Grasshopper Pueblo, Arizona. *Journal of Field Archaeology* 12(1): 41-63.
- Clarkson, Chris
2002 An Index of Invasiveness for the Measurement of Unifacial and Bifacial Retouch: A Theoretical, Experimental, and Archaeological Verification. *Journal of Archaeological Science* 29:65-75.
- Cotterell, Brian, and Johan Kamminga
1987 The Formation of Flakes. *American Antiquity* 52(4):675-708.
- Cowan, Frank L.
1999 Making Sense of Flake Scatters: Lithic Technology Strategies and Mobility. *American Antiquity* 64(4):593-607.
- Dibble, Harold L., and Andrew Pelcin
1995 The Effect of Hammer Mass and Velocity on Flake Mass. *Journal of Archaeological Science* 22:429-439.
- Dibble, Harold L., Utsav A. Schurmans, Radu P. Iovita, and Michael V. McLaughlin
2005 The Measurement and Interpretation of Cortex in Lithic Assemblages. *American Antiquity* 70(3):545-560.
- Diehl, Michael W.
1998 The Interpretation of Archaeological Floor Assemblages: A Case Study from the American Southwest. *American Antiquity* 63(4):617-634.
- Eren, Metin I., and Mary E. Prendergast
2008 Comparing and Synthesizing Unifacial Stone Tool Reduction Indices. In *Lithic Technology: Measures of Production, Use, and Curation*, edited by William Andrefsky, Jr., pp. 49-86. Cambridge University Press, UK.
- Fenega, Franklin
1956 Excavations at Site LA 2579: A Mogollon Village Near Gran Quivira, New Mexico. In *Pipeline Archaeology* edited by Fred Wendorf. Laboratory of Anthropology and Museum of Northern Arizona, Santa Fe and Flagstaff.

- Gilman, Patricia A.
1987 Architecture as Artifact: Pit Structures and Pueblos in the American Southwest. *American Antiquity* 52(3):538-564.
- Graves, William M. and Katherine A. Spielmann
2000 Leadership, Long-Distance Exchange, and Feasting in the Protohistoric Rio Grande. In *Alternative Leadership Strategies in the Prehispanic Southwest*, edited by Barbara J. Mills, 45-59. The University Arizona Press, Tucson.
- Graves, William M.
2004 Social Identity and the Internal Organization of the Jumanos Pueblos Settlement Cluster in the Salinas District, Central New Mexico. In *The Protohistoric Pueblo World, A.D. 1275-1600*, edited by E. Charles Adams and Andrew I. Duff, 43-52. The University of Arizona Press, Tucson.
- Graves, William M.
2005 Obsidian Procurement Among the Jumanos Pueblos, New Mexico. A.D. 1300-1670s. *Kiva* 71(1):7-35.
- Hayes, Alden C. (editor)
1981a *Contributions to Gran Quivira Archaeology*. Publications in Archaeology No. 17. National Park Service, Washington, D.C.
- Hayes Alden C. (editor)
1981b *Excavation of Mound 7, Gran Quivira National Monument, New Mexico*. Publication in Archaeology 16. National Park Service. Washington, D.C.
- Howard, Richard M.
1981 An Adobe Lined Pit at Gran Quivira. . In *Contributions to Gran Quivira Archaeology*, edited by Alden C. Hayes, pp. 13-14. Publications in Archaeology No. 17. National Park Service, Washington, D.C.
- Ice, Ronald J.
1968 *A Report on 1964 Excavations at Gran Quivira*. Manuscript on file, Salinas Pueblo Missions National Monument, New Mexico.
- Ivey, James E.
1988 *In the Midst of A Loneliness: The Architectural History of the Salinas Missions*. Southwestern Cultural Resources Center Professional Paper No. 15. Southwest Regional Office of the National Park Service, Santa Fe, New Mexico.
- James, Steven R.
1997 Change and Continuity in Western Pueblo Households during the Historic Period in the American Southwest. *World Archaeology* 28(3): 429-456.

- Jeske, Robert J.
1992 Energetic Efficiency and Lithic Technology: An Upper Mississippian Example. *American Antiquity* 57(3):467-481.
- Kelly, Robert L.
1988 The Three Sides of a Biface. *American Antiquity* 53(4):717-734.
- Kenzle, Susan C.
1997 Enclosing Walls in the Northern San Juan: Sociophysical Boundaries and Defensive Fortifications in the American Southwest. *Journal of Field Archaeology* 24(2): 195-210.
- Kuhn, Steven L.
1990 A Geometric Index of Reduction for Unifacial Stone Tools. *Journal of Archaeological Science* 17:585-93.
- Mera, H.P.
1940 *Population Changes in the Rio Grande Glaze-Paint Area*. Laboratory of Anthropology, Technical Series Bulletin No. 9, Santa Fe, New Mexico.
- Morrow, Toby A.
1997 A Chip Off the Old Block: Alternative Approaches to Debitage Analysis. *Lithic Technology* 22:51-69.
- Nelson, Margaret C.
1991 The Study of Technological Organization. *Archaeological Method and Theory* 3(1):57-100.
- Odell, George H.
2004 *Lithic Analysis*. Kluwer Academic/Plenum Publishers, New York.
- Parry, William and Robert L. Kelly
1987 Expedient Core Technology and Sedentism. In *The Organization of Core Technology* edited by J.K. Johnson and C.A. Morrow. Westview Press, Boulder Colorado.
- Pelcin, Andrew
1997a The Effect of Indenter Type on Flake Attributes: Evidence from a Controlled Experiment. *Journal of Archaeological Science* 24 613-621.
- Pelcin, Andrew W.
1997b The Formation of Flakes: The Role of Platform Thickness and Exterior Platform Angle in the Production of Flake Initiations and Terminations. *Journal of Archaeological Science* 24 1107-1113.
- Prentiss, William C.

1998 The Reliability and Validity of a Lithic Debitage Typology: Implications for Archaeological Interpretation. *American Antiquity* 63(4):635-650.

Rautman, Alison E.

1990 *The Environmental Context of Decision-Making: Coping Strategies Among Prehistoric Cultivators in Central New Mexico*. Ph.D dissertation, University of Michigan, University Microfilms: Ann Arbor, MI.

Rautman, Alison E.

1992 *Preliminary Report of the 1992 Field Season at LA-2091 Pueblo de la Mesa, Cibola National Forest, New Mexico*. Unpublished manuscript on file at the Museum of New Mexico Sante Fe, and the Salinas Pueblo Missions National Monument, Mountainair, as well as the Department of Anthropology at Michigan State University, East Lansing, Michigan.

Rautman, Alison E.

1993a Resource Variability, Risk, and the Structure of Social Networks: An Example from the Prehistoric Southwest. *American Antiquity* 58(3):403-424.

Rautman, Alison E.

1993b *Preliminary Report of the 1993 Field Season at LA-2091 Pueblo de la Mesa, Cibola National Forest, New Mexico*. Unpublished manuscript on file at the Museum of New Mexico Sante Fe, and the Salinas Pueblo Missions National Monument, Mountainair, as well as the Department of Anthropology at Michigan State University, East Lansing, Michigan.

Rautman, Alison E.

1995 *Final Report on the Excavation of Pueblo de la Mesa, Cibola National Forest, Torrance County, New Mexico*. Unpublished manuscript submitted to the USDA Forest Service, Cibola National Forest.

Rautman, Alison E.

2000 Population Aggregation, Community Organization, and Plaza-Oriented Pueblos in the American Southwest. *Journal of Field Archaeology* 27(3) 271-284.

Rautman, Alison E. (ed.)

2008 *The Role of Corporate Groups in the Development of Early Pueblos: Preliminary Report of the 2007 Excavations at LA-9032, Frank's Ruin, Socorro County, New Mexico*. Unpublished Manuscript submitted to the State of New Mexico Department of Cultural Affairs, Historic Preservation Division. Sante Fe, NM.

Rocek, Thomas R.

1995 Sedentarization and Agricultural Dependence: Perspectives from the Pithouse-to-Pueblo Transition in the American Southwest. *American Antiquity* 60(2):218-239.

- Schiffer, Michael B.
1983 Toward the Identification of Formation Processes. *American Antiquity* 48(4):675-706.
- Schiffer, Michael B.
1985 Is There a "Pompeii Premise" in Archaeology. *Journal of Anthropological Research* 41(1):18-41.
- Shelley, Phillip H.
1990 Variation in Lithic Assemblages: An Experiment. *Journal of Field Archaeology* 17(2):187-193.
- Shott, Michael J.
1994 Size and Form in the Analysis of Flake Debris: Review and Recent Approaches. *Journal of Archaeological Method and Theory* 1(1):69-110.
- Shott, Michael J.
1996 An Exegesis of the Curation Concept. *Journal of Anthropological Research* 52(3):259-280.
- Shott, Michael J.
2000 The Quantification Problem in Stone-Tool Assemblages. *American Antiquity* 65(4):725-738.
- Sokal, Robert R. and F. James Rohlf
1989 *Biometry: Principles and Practice of Statistics in Biological Research* (3rd Edition). W.H. Freeman and Company, New York.
- Spielmann, Katherine A.
1988 *Economy and Society at Pueblo Colorado, New Mexico: Report of the 1989 Excavations*. Report submitted to the USDA Forest Service, Cibola Office, Albuquerque.
- Spielmann, Katherine A.
1994 Clustered Confederacies: Sociopolitical Organization in the Protohistoric Rio Grande in *The Ancient Southwestern Community: Models and Methods for the Study of Prehistoric Social Organization* edited by Robert D. Leonard, pp. 45-54. University of New Mexico Press, Albuquerque.
- Spielmann, Katherine A.
1996 Impression of Pueblo III Settlement Trends among Rio Abajo and Eastern Border Pueblos in *The Prehistoric Pueblo World: A.D. 1150-1350* edited by Michael A. Adler, pp. 177-187. The University of Arizona Press, Tucson.
- Spielmann, Katherine A.

- 2004 Clusters Revisited. In *The Protohistoric Pueblo World: A.D. 1275-1600*, edited by E. Charles Adams and Andrew I. Duff, 137-143. The University of Arizona Press, Tucson.
- Stuart, David E. and Rory P. Gauthier
1981 *Prehistoric New Mexico: Background for Survey*. Historic Preservation Bureau, Santa Fe.
- Sullivan III, Alan P., and Kenneth C. Rozen
1985 Debitage Analysis and Archaeological Interpretation. *American Antiquity* 50(4):755-779.
- Tainter, Joseph A. and Frances Levine
1987 *Cultural Resources Overview: Central New Mexico*. USDA, Forest Service, Albuquerque.
- Teltser, Patrice A.
1991 Generalized Core Technology and Tool Use: A Mississippian Example. *Journal of Field Archaeology* 18(3):363-375.
- Toulouse Jr., Joseph H.
1944 Cremation among the Indians of New Mexico. *American Antiquity* 10(1):65-74.
- Trigger, Bruce G.
1989 *A History of Archaeological Thought*. Cambridge University Press, Cambridge, UK.
- Warren, A. Helene
1981 A Petrographic Study of the Pottery at Gran Quivira. In *Contributions to Gran Quivira Archaeology*, edited by Alden C. Hayes, pp. 57-74. Publications in Archaeology No. 17. National Park Service, Washington, D.C.
- Whittaker, John C., and Michael Stafford
1999 Replicas, Fakes, and Art: The Twentieth Century Stone Age and Its Effects on Archaeology. *American Antiquity* 64(2):203-214.
- Young, Jon Nathan
1981 Stone Artifacts of Mound 7. In *Excavation of Mound 7, Gran Quivira National Monument, New Mexico*, edited by Alden C. Hayes, pp. 105-140. Publications in Archaeology No. 16. National Park Service. Washington, D.C.
- Young, Lisa C., and Karen G. Harry
1989 A Preliminary Analysis of Temporal Changes in the Homol'ovi III Chipped Stone Assemblage. *The Kiva* 54(3):273-284.

MICHIGAN STATE UNIVERSITY LIBRARIES



3 1293 03063 0150